Second Five-Year Review Report
FAA Technical Center

Atlantic City International Airport
Atlantic County, New Jersey

Prepared by:
Federal Aviation Administration
William J. Hughes Technical Center
Atlantic City International Airport, New Jersey

September 2004

Table of Contents

Five-Year Review Summary Form

SITE IDENTIFICATION

Site name *(from WasteLAN)*: FAA Technical Center

EPA ID *(from WasteLAN)*: NJ9690510020

Region: 2	**State:** NJ	**City/County:** Egg Harbor Township/Atlantic

SITE STATUS

NPL status: X Final ☐ Deleted ☐ Other (specify)
_____

Remediation status (choose all that apply): X Under Construction X Constructed X Operating

Multiple OUs?* X YES ☐ NO	**Construction completion date:** N/A

Are portions of this site in use? X YES ☐ NO ☐ N/A

REVIEW STATUS

Lead agency: ☐ EPA ☐ State ☐ Tribe X Other Federal Agency: Federal Aviation Administration

Author name: Keith Buch

Author title: Project Manager	**Author affiliation:** FAA

Review period:** 09/22/1999 to 08/30/2004

Date(s) of site inspection: 5/13/2004

Type of review:
X Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Policy ☐ Regional Discretion

Review number: □ 1 (first) X 2 (second) □ 3 (third) □ Other (specify) _____

Triggering action:
☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU#____
☐ Construction Completion X Previous Five-Year Review Report
☐ Other (specify)

Triggering action date *(from WasteLAN)*: 9/22/1999 (Previous Five-Year Review)

Does the report include recommendation(s) and follow-up action(s)? ☐ yes X no
Is human exposure under control? X yes ☐ no
Is contaminated groundwater under control? X yes ☐ no
Is the remedy protective of the environment? yes
Acres of land in use or suitable for reuse: 4,427 (unrestricted).

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

1.0 Introduction

The review was conducted by Federal Aviation Administration (FAA) Project Manager Keith Buch. This review was conducted pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended, 42 U.S.C. Section 9601, et seq., and 40 C.F.R. 300.430(f)(4)(ii) and in accordance with the Comprehensive Five-Year Review Guidance, Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-03B-P (June 2001). The purpose of a five-year review is to assure that implemented remedial actions protect public health and the environment and that they function as intended by the decision documents. This review will become part a part of the Administrative Record for the FAA Technical Center.

This is the second five-year review for the FAA Technical Center site. In September 1999, EPA conducted the first five-year review, which included a review of documents, data, and information. The 1999 five-year review determined that the remedies selected should protect public health and the environment.

The FAA Technical Center is currently being addressed under 15 operable units covering twenty-seven areas of concern.

2.0 Site Chronology

Chronology of Events

Event	Date
NJDEP conducts assessment of pollution sources at FAA that may impact proposed Atlantic City Municipal Well Field	1984
OU11 - Area 27 (Fuel Mist Test Area) Removal Action	1986
OU10 - Area P (Building 204 Spill Area) Removal Action	1987
Facility-Wide Phase I Environmental Investigation/Feasibility Study (EI/FS) , Phase II EI/FS and Supplemental EI/FS	1987-1990
OU1 - Area D (Jet Fuel Farm) Removal Action	1988
OU1 - Area D (Jet Fuel Farm) Record of Decision (ROD) signed	1989
OU3 - Area G (Transformer Storage Area) Removal Action	1989-1990
FAA Technical Center was placed on the National Priorities List	1990

Event	Date
OU2 - Area 20A (Salvage Yard) ROD signed	1990
OU3 - Area G (Transformer Storage) ROD signed	1992
Federal Facility Agreement signed between the Department of Transportation-FAA and EPA	1993
OU4 - Area C (Butler Aviation), Area H (Salvage Yard), and Area M (Bldg. 202/Gelled Fuel Test Area) ROD signed	1994
OU5 - Area I (Former Incinerator) and Q (Fire Station) ROD signed	1994
OU2-Area 20A (Salvage Yard) Explanation of Significant Differences signed	1995
OU1 - Area D (Jet Fuel Farm) Remedial Action commenced	1995
OU6 - Area 29 (Fire Training) and Area K (Storage Area) ROD signed	1996
OU8 - Area B (Navy Fire Test Facility) ROD signed	1996
OU2 - Area 20A (Salvage Yard) Remedial Action commenced	1996
OU9 - Area A (Navy R&D Landfill), Area J (Excavation Area Near Runway), and Area N (Bldg. 214, Catapult Test Area) ROD signed	1997
OU10 - Area P (Bldg. 204 Fuel Spill) ROD signed	1997
OU11 - Area 27 (Fuel Mist Test Area), Area 56 (Abandoned Navy Landfill), Area F (Air Blast Facility), Area R (Trash Dump Near Bldg. 169), and Area S (Excavation West of Tilton Road) ROD signed	1999
OU6 - Area 29 (Fire Training) Remedial Action Construction commenced	2000
OU7 - Area 41 (Fuel Farm and Photo Lab) ROD signed	2000
OU8 - Area B (Navy Fire Test Facility) Remedial Action Construction commenced	2003

Event	Date
OU7 - Area 41 (Fuel Farm and Photo Lab) Remedial Action Construction commenced	2003
OU13 - Area E (Bldg. 11 Tank Excavation) ROD signed	2003
OU6 - Area 29 (Fire Training) Remedial Action commenced	2004

3.0 Facility-Wide Background

3.1 Physical Characteristics

The FAA William J. Hughes Technical Center is located eight miles northwest of Atlantic City, with the majority of the facility located with Egg Harbor Township, Atlantic County, New Jersey. The facility is approximately 5,052 acres in size, bordered by the Garden State Parkway to the east, the New Jersey Transit Authority Railroad to the northeast, State Route 575 to the northwest, the Atlantic City Expressway to the southwest, and Westcoat Road to the southeast.

Land use within one mile of the FAA Technical Center boundary includes open and forested lands, and commercial and residential areas. All residential areas in the vicinity appear to be upgradient or otherwise isolated from the groundwater flow at the FAA Technical Center. However, Atlantic City's municipal water supply is provided by nine production wells located on FAA property, along the northern edge of the Upper Atlantic City Reservoir. Water is also drawn directly from the Lower Atlantic City Reservoir, which is not FAA property. An estimated 37,000 residents and 113,000 visitors during peak season obtain drinking water from the Atlantic City wells and reservoir. The reservoirs are fed by the North Branch of Absecon Creek (NBAC) and South Branch of Absecon Creek (SBAC), both of which traverse the FAA Technical Center grounds.

3.2 Geology/Hydrogeology

The FAA Technical Center is located within the Atlantic Coastal Plain, a wedge of Cretaceous- and Tertiary-aged, semi-consolidated sediments that overlap Precambrian- and Paleozoic-aged crystalline rocks. The three geologic units of relevance at the FAA Technical Center include the Cohansey Sand, the Bridgeton Formation and the Kirkwood Formation. The Cohansey Sand is the predominant geologic formation as it outcrops throughout a majority of the FAA Technical Center. Highly variable in composition and thickness, the Cohansey Sand is subdivided into two to three zones defined as the Upper Cohansey Sand (unconfined aquifer), Middle Cohansey Sand (intermediate aquifer) and Lower Cohansey Sand (lower aquifer). Quartz sands intermixed with pebbly and silty/clayey sands with clay interbeds are the dominant features of the Cohansey Sand and its average thickness is approximately 156 feet. Across the facility, a clay layer approximately 20 feet in thickness is located below ground surface at a depth of 80 to 100 feet. This clay layer acts to prevent contamination from migrating from the upper aquifers to the lower aquifers. In some areas in the vicinity of the FAA Technical Center, the Cohansey Sand is

overlain by the Bridgeton Formation, a formation of fluvial sands and gravel derived from the Cohansey Sand. The Kirkwood Formation, consisting primarily of sand, clay, and gravel, underlies the Cohansey Sand. It is from this formation that the nine Atlantic City municipal water supply wells located at the FAA Technical Center draw their water.

As indicated above, the unconfined aquifer occurs in the Upper Cohansey Sand and depth to groundwater seasonably ranges from 0 to 20 feet below the ground surface. Depth to groundwater varies during the year, rising during periods of heavy rainfall and falling during low rainfall or drought. Correspondingly, the unconfined aquifer periodically discharges to the upper reaches of the on-site streams (the SBAC and NBAC) and more consistently to the lower reaches of the streams and the Upper Reservoir.

3.3 Land and Resource Use {tc "3.3 Land and Resource Use " \l 2}

In addition to the FAA facilities, major installations at the FAA Technical Center include the South Jersey Transportation Authority's Atlantic City International Airport and the New Jersey Air National Guard's (NJANG's) 177th Fighter Wing. As previously mentioned, Atlantic City's municipal water supply is provided by nine production wells located north of the Upper Atlantic City Reservoir on FAA Technical Center property and by water drawn directly from the Lower Atlantic City Reservoir, which is not on FAA Technical Center property.

The FAA Technical Center is located within the Pinelands National Reserve (the Pinelands). The Pinelands is an important ecological region, characterized by pine, oak and cedar forests, swamps, and slow-moving, acidic streams. The physical characteristics of the region create a relatively harsh environment with generally low habitat diversity, thereby limiting the variety of animals. The acidic stream waters with low alkaline metals and high iron content support a unique fauna and flora dissimilar to most natural areas.

All of the site is considered to be in use or suitable for reuse except for those areas being actively remediated and which are discussed later in this report. As the site is located in the Pinelands, all forested areas within the site are considered to be in use as an environmental preserve. Consequently, 4,427 acres are considered to be in use or suitable for reuse. While the term restricted is generally applied to areas where site contaminants remain, for this particular site all of the land area is considered restricted because of current use and because of Pinelands requirements.

3.4 History of Contamination {tc "3.4 History of Contamination " \l 2}

The FAA Technical Center property was first developed during the 1930s, when it was established as the Atlantic City Watershed, the main water supply for the city. In 1936, the City dammed both the SBAC and NBAC to create the Upper and Lower Atlantic City Reservoirs, respectively. In the 1940s, the Atlantic City Municipal Airport and a U.S. Naval Air Station were established at the site. It was during this time that contamination was first introduced to the site by Navy and airport operations. In 1958, the Naval facility was transferred to the Airways Modernization Board (AMB) and the installation was designated the National Aviation Facilities Experimental Center (NAFEC). In 1958, the FAA was established and took over the operation

of the AMB, including NAFEC. FAA operations, especially during the 1960s and 1970s, involved releases that also resulted in site contamination. Site contamination, on an Operable Unit basis, is described below in Section 4., Remedial Actions.

3.5 Initial Response *{tc "*3.5 Initial Response *" \l 2}*

In 1984, the New Jersey Department of Environmental Protection (NJDEP) conducted an assessment of pollution sources that could impact the then-proposed Atlantic City Municipal Well Field to be located on FAA property. The assessment included a review of all data on possible contaminant sources in the area, limited field investigation of these sources, and soil and groundwater sampling at the five areas considered to pose the greatest potential threat to groundwater supplies in the area. The entire FAA Technical Center was included in the study and the five areas identified were all located on FAA property. Hydrogeological studies of the five areas indicated that the development of the well field could proceed. As a result of the NJDEP assessment, FAA conducted a facility-wide environmental assessment between 1987 and 1990. The site was placed on the National Priorities List in 1990. A Federal Facility Agreement (FFA) was signed between the Department of Transportation-FAA and the EPA in 1993.

The principal concern for site listing on the NPL was groundwater contamination. Consequently, the focus of site remediation is towards restoring the groundwater aquifer to New Jersey Ground Water Quality Standards which are defined as background groundwater quality or practical quantitation limits, whichever is higher. To a lesser extent, site remediation has dealt with other contaminated media such as soil, surface water, and sediment. The various site assessments have been directed towards all contaminated media with a particular emphasis on groundwater clean up. Twenty-seven potentially contaminated areas have been located and will be addressed through remedies selected in RODs. Most of the land portion of the site is not covered by any of these RODs. This is because large portions of the site have not been identified as a potential source of contamination under this CERCLA listing and are not addressed under the FFA. This does not necessarily mean that these areas are free of any environmental contamination, but that they do not have any record of site use which may have led to a contaminant release. Consequently, for the purposes of this review, these areas are not covered by CERCLA requirements and are not included in this five-year review.

4.0 Remedial Actions, Technical Assessment, Issues, Recommendations and Follow-up Actions, and Protective Statements on an Operable-Unit Basis

As of the date of this Report, twelve RODs have been signed for twelve out of fifteen Operable Units (OUs) at the FAA Technical Center. The twelve OUs, covering twenty-two of the twenty-seven sites at the FAA include:

- OU01-Area D, Jet Fuel Farm
- OU02-Area 20A, Salvage Area
- OU03-Area G, Transformer Storage
- OU04-Area C, H, M: Butler Aviation, Salvage Yard, Bldg. 202/Gelled Fuel Test
- OU05-Area I, Q: Incineration Bldg., Fire Station
- OU06-Area 29, K: Fire Training, Storage Area

- OU07-Area 41, Fuel & Photo Lab
- OU08-Area B, Navy Fire Test Facility
- OU09-Area A, J, N: Navy R&D, Excavation, Catapult Test Bldg. 214
- OU10-Area P, Bldg. 204 Fuel Spill
- OU11-Area 27, 56, R, S, F: Fuel Mist, Navy Landfill, Air Blast, Dump, Excavation
- OU13-Area E, Bldg. 11 Tank Excavation

Individual site locations are indicated in Figure 1. RODs for the remaining OUs (12, 14, 7A), consisting of five sites (four NJANG sites (OU12) and Area U-Absecon Creek Watershed (OU14)) and a new operable unit at OU07, are still pending. No data has been received regarding OU7A-Area 41-PAH contaminated soil and it will not be discussed in this five-year review.

OU01 - Area D - Jet Fuel Farm:

History of Contamination and Initial Response

Area D, the Jet Fuel Farm, is located near the juncture of the access roads leading to the Atlantic City International Terminal and the Center's Technical/Administrative Building. In the late 1980s, jet fuel was stored in two large aboveground bermed tanks. Prior to 1972, fuel was stored in two 567,000-gallon underground storage tanks. Dry wells, piping, the underground storage tanks and historic spills were suspected to be sources of contamination at the site. In 1994, the pumping equipment was decommissioned, removed, and interconnecting piping drained, flushed and capped. Jet fuel is now stored in two 420,000-gallon aboveground bermed tanks located at a newly constructed site within the Air National Guard portion of the Technical Center facility.

The FAA's Environmental Investigation (EI) was conducted in two phases between December 1986 and December 1988. The most significant environmental problem identified at Area D during the EI was a hydrocarbon (JP-4 jet fuel) plume floating on the water table. As an interim remedial measure, product recovery pumps were installed between August 1988 and March 1989 in three on-site wells. Also identified during the EI was a groundwater plume located beneath the floating product consisting primarily of organic compounds associated with jet fuel. Soil contamination was primarily limited to subsurface petroleum contamination.

Basis for Taking Action

Contaminants

Contaminants of concern (COCs), as identified in the Human Health Risk Assessment (HHRA) for Area D, in each medium include:

Soil	Groundwater
Benzene	Benzene
Toluene	Toluene
Ethylbenzene	Ethylbenzene

Soil	Groundwater
Xylene	Xylene
Phenol	Naphthalene
2-Chlorophenol	Phenol
Chromium	Chromium
Lead	Nickel
	Lead

Human Health Risk Assessment

Since use of Area D was expected to be limited to fuel transfer-type activities at the time the HHRA was prepared, the soil exposure frequencies used in the risk assessment were restrictive. For example, exposure to surface soil was based on a maximum exposure frequency of 24 times/year. Exposure to groundwater was based on a commercial/industrial exposure scenario, assuming a potable well was installed at the site, with a maximum exposure frequency of 250 days/year. Exposure to groundwater at Area D is associated with significant human health risks due to exceedance of EPA's risk-management criteria (probability in the range of one in one million to one in ten thousand of an individual contracting cancer due exclusively to exposure to site contaminants). Potential risks associated with groundwater are attributed to the presence of volatile organic compounds (VOCs) that exceed State and Federal Maximum Contaminant Levels (MCLs). Risks due to exposure to soil were below EPA's risk-management criteria but total petroleum hydrocarbon (TPH) levels detected in subsurface soils exceeded the NJDEP total petroleum hydrocarbon soil action level of 100 ppm applicable at the time the ROD was signed.

Ecological Risk Assessment

An ecological risk assessment (ERA) was not conducted as part of the EI/FS activities at Area D. A qualitative evaluation of potential ecological risks was conducted in 1996 as part of a facility-wide ERA conducted by the U.S. Fish & Wildlife Service (USFWS). The evaluation concluded that potential risks to terrestrial receptors is minimal, although potential risks to aquatic receptors could occur as a result of the potential discharge of groundwater to the SBAC (the SBAC is being addressed as part of Area U).

Remedy Selection

The ROD for this site was signed on September 29, 1989. The selected remedy for Area D includes the following components:

- Free-product extraction and off-site incineration;
- Groundwater extraction, addition of nutrients, and subsequent re-injection upgradient of the contaminated area;
- Soil vapor extraction (SVE), a system which extracts gas from the soil pore space; and
- Treatment of off-gas from SVE consisting of a catalytic incinerator.

Remedy Implementation and Remedial Systems

Free product extraction and off-site incineration was initiated in 1988 as an interim removal action and has continued to the present. A total estimated volume of approximately 200,000 gallons of free-phase product has been extracted from the subsurface since 1988 (see Table 1). The SVE system has been operating periodically (based on water table conditions) since July 2001 and has removed nearly 10,000 gallons of product as propane. Groundwater extraction, treatment and reinjection into the aquifer have been operating continuously since February 1995. Due to the continued presence of free product in the subsurface, the bioremediation component of the groundwater remediation system (i.e., addition of nutrients to the reinjected groundwater) has not yet begun. Figure 2 shows the locations of recovery, observation, monitoring and injection wells, along with the locations of the infiltration galleries.

One remedial contractor (URS Corporation) operates both the Area D and Area 20A remedial systems. The annual cost of operation for these two systems combined for each of the past five years is as follows:

OPERATING PERIOD	COST
September 13, 1998 - September 12, 1999	$1,391,000
September 13, 1999 - September 12, 2000	$1,303,000 (includes continuous emission monitoring (CEM) system upgrades)
September 13, 2000 - September 12, 2001	$1,482,000
September 13, 2001 - September 12, 2002	$1,532,000 (includes in situ pilot testing)
September 13, 2002 - September 12, 2003	$1,552,000
September 13, 2003 - September 12, 2004	$1,276,000(estimated)

Systems Operations/Operation & Maintenance

The existing remedial system requires on-going operation and maintenance of the groundwater, product and soil gas extraction systems, the groundwater treatment system including filtration and carbon adsorption units, the catalytic oxidation unit used to treat the extracted soil gas, and the infiltration galleries. Temporary system shutdowns are conducted each August to address normal O&M activities that can only be conducted in a shutdown mode. Product level measurements are often conducted during the shutdown period to determine product thicknesses (and therefore, the extent of the free product plume) under non-pumping conditions.
Groundwater was extracted from fifteen wells (R1 to R15) until 2000/2001, when R11 through R15 were shut down, based on the results of an aquifer study. Treated groundwater is injected back into the aquifer via eight infiltration galleries. Galleries 1 and 1A are the most efficient galleries for treated water injection, continuously accepting flow at rates up to 20 gallons per minute (gpm). Gallery 2 will only accept water at flow rates to 10 gpm; use of Gallery 2 often results in short-circuiting and resultant high water levels in Gallery 3. Gallery 3 normally accepts little water, although under drought conditions, up to 10 gpm can be discharged to this gallery. Galleries 4 and 5 are also limited in the amount of discharge they can accept. Galleries 6 and 7 can be used almost continuously at flow rates up to 7 gpm.

Problems experienced with the remedial system since September 1999 include the following:

- early breakthrough of carbon adsorption units in groundwater treatment system;
- presence of high groundwater levels adversely affecting the implementation of the SVE system and adversely impacting the recharge of treated groundwater via the infiltration galleries;
- a reduction in free product extraction rates; and
- problems with maintaining normal operating temperatures in the catox burner.

Normal O&M activities and treatment system adjustments conducted since September 1999 to address these problems include the following:

- the replacement of the original carbon vessels with high-pressure-rated vessels and the addition of an organoclay filter prior to the equalization tank in the groundwater treatment system to capture any slugs of free product that might enter the system and thereby extend the life of the downstream carbon filters;
- adjustments to treated water discharge methods when high water tables resulted in flooded infiltration galleries, including the implementation of sprinkler discharges to the ground surface, the use of an auger to break up sand in the infiltration galleries, and the installation and redevelopment of 2 injection wells;
- adjustment of extraction pump set points to optimize groundwater and product extraction;
- shifting from automatic product extraction at wells R4, R6, R7 and R9 to manual product extraction at any monitoring or observation well that accumulates product, due to a drop in product levels that made automatic extraction no longer feasible; and
- adjustments to the CEM and SVE systems, including replacement of some equipment, to optimize operation.

Under the terms of the NJPDES discharge to ground water (DGW) permit equivalent, the treatment system effluent must be sampled on a monthly basis for Priority Pollutant (PP) metals, semi-volatile organic compound (SVOC) and VOC analyses. Flow is measured on a daily basis, and pH and specific conductance are measured monthly. Since the last five-year review, the daily flow rate has averaged 50.2 gallons per minute, although the flow rate has gradually increased over the entire five-year period (from an average rate of 26.5 gpm in 1999 to 57.3 gpm in 2003). This is mainly attributable to the increase in water table elevations observed over the same period and the desire to keep water elevations low to allow for operation of the SVE system. Effluent quality over this period has generally complied with the practical quantitation limits (PQLs) specified in the NJPDES DGW permit equivalent. The constituents most often detected in the effluent above PQLs include iron, zinc and lead. The PQLs for benzene and xylenes were exceeded twice during the monthly effluent sampling conducted between September 1999 and April 2001, with no exceedances detected between May 2001 and March 2004. In May 2001, the organoclay filter was added to the treatment train and, based on these results, it appears to be successful in eliminating VOCs from the effluent.

In May 2002, the FAA conducted a pilot test involving the injection of Oxygen Release Compound (ORC®) into the shallow aquifer, immediately upgradient of downgradient wells

D-MW16S and D-MW19S. ORC® is a formulation of magnesium peroxide that slowly releases molecular oxygen when in contact with soil moisture or groundwater. The release of oxygen enhances the metabolism of natural microbes that aerobically degrade hydrocarbon contaminants, such as benzene, toluene, ethylbenzene and xylene (BTEX) compounds. Three observation wells (ORC-1, ORC-2 and ORC-3) were installed just downgradient of well D-MW16S to assist in the evaluation of the effectiveness of the test. A baseline round of groundwater sampling was conducted prior to ORC® injection, followed by additional sampling rounds one week, one month, two months and three months after injection. Monitoring parameters included VOCs, metabolic products (e.g., lactic, acetic and pyruvic acids) and attenuation factors such as dissolved oxygen (DO), oxidation-reduction potential (ORP) and others. A decrease in BTEX concentrations was observed in wells D-MW16S, ORC-1, ORC-2 and ORC-3, along with evidence that the intended biochemical reactions were occurring (e.g., increased DO and increased ORP). No decrease in the concentrations of target compounds was observed at D-MW19S. It was hypothesized that the low hydraulic gradient at this well location, coupled with the saturated nature of the soils (due to recent rain events), adversely impacted the distribution of the ORC® after injection in this area.

Overall, the combined operation of the treatment systems at Area D and Area 20A has fallen within the allocated budget. Operational changes now allow the treatment systems to operate in an automatic mode during evenings and weekends, thereby reducing manpower requirements and associated operating costs. Significant operational changes that have impacted operational costs since the last five-year review include the following:

Operational Item	**Associated Cost (Savings)**
CEM upgrade	$83,400
ORC® study	$164,000 (cost includes Area 20A HRC® study as well)
Plant automation	($306,000/year)
Injection well installation	$19,000

Data Review

Groundwater Monitoring

Under the terms of the NJPDES DGW permit equivalent, downgradient wells D-MW20S (formerly D-MW15S) and D-MW21S (formerly D-MW13S) must be sampled on a monthly basis for priority pollutant metals, SVOCs and VOCs. A review of available monitoring data indicates that iron is the only constituent detected above PQLs in these wells over the past five years and it has not been detected above PQLs since November 2000.

As of the last five-year review, a concern was noted regarding the detection of BTEX compounds in well D-MW16S, located on the southern (downgradient) edge of the dissolved groundwater plume. At that time, BTEX compounds were not detected in a groundwater sample from recovery well R-1, the recovery well located closest to D-MW16S, potentially indicating

that the recovery well was not capturing the dissolved plume in this area. In the fall of 1999, the pump in recovery well R-1 was raised to improve recovery at this location. The groundwater captured by R-1 has not been sampled since then. As part of regular operation and maintenance activities at Area D, the FAA continues to sample D-MW16S and other Area D monitoring wells located around the perimeter of the contaminated area on a quarterly basis. Immediately after the pump was raised in R-1, VOC concentrations at D-MW16S dropped. However, in subsequent sampling rounds, BTEX compounds (specifically, benzene, ethylbenzene and total xylenes) continued to be detected in well D-MW16S at levels exceeding PQLs, although the levels fluctuated with time. The highest concentrations of total xylenes and ethylbenzene detected in this well were identified during the August 2003 sampling event. In addition, benzene has consistently been detected in downgradient wells D-MW18S and D-MW19S at levels exceeding PQLs since May 2002 and March 2000, respectively. No VOCs have been detected in surface water samples collected from the adjacent portions of the SBAC over this period.

As described previously, an ORC® injection pilot test was conducted just upgradient of wells D-MW16S and D-MW19S in May 2002 in response to the continued presence of VOCs in D-MW16S. This study indicated that ORC® injection was effective in temporarily reducing the levels of BTEX-related compounds at D-MW16S in the 3 to 6 months following ORC® injection, although similarly successful results were not observed in the vicinity of D-MW19S. While it has been recommended that ORC® injection continue in this portion of the site as a means to treat the shallow groundwater contamination in this area, the effectiveness of ORC® injection in the vicinity of D-MW18S and D-MW19S has yet to be proven.

Other Area D perimeter wells monitored on a quarterly basis have generally exhibited no or minimal exceedances of PQLs for organic analytes. For inorganic analytes, iron is most commonly detected above PQLs in the perimeter wells. Mercury has also been detected above PQLs in wells D-MW18S and D-MW19S, but the presence of mercury along the SBAC is being investigated under a separate operable unit (Area U). Zinc, lead and nickel have also rarely been detected above PQLs in various wells.

Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

In the first five-year review, the question was raised regarding whether recovery well R-1 was adequately capturing the downgradient portion of the dissolved groundwater contaminant plume. Corrective action, consisting of raising the pump within the well screen of recovery well R-1, was taken by the FAA. However, the continued detection of BTEX compounds above PQLs in adjacent monitoring well D-MW16S as well as downgradient wells D-MW18S and D-MW19S indicate that the recovery well still is not successfully containing the downgradient edge of contamination. A pilot study of ORC® injection indicated mixed success with respect to treating this area of contamination, with positive results detected at D-MW16S but no impact detected at D-MW19S.

Since the last five-year review, free product levels have decreased significantly in extraction wells, to the point where extraction is now conducted manually. Once free product levels have been sufficiently reduced, the bioremediation portion of the remedy can be implemented.

Groundwater extraction, treatment and reinjection has continued since the last five-year review. Effluent limitations stipulated in the NJPDES DGW permit equivalent are generally achieved by the treatment system. Periodic exceedances of the discharge standard for benzene in the effluent have been addressed through the addition of an organoclay filter to the treatment train, prior to the equalization tank.

The SVE system has operated successfully since the last five-year review in removing residual product from the vadose zone, especially during those periods when the water table elevation is not elevated. Extended periods of high water table elevations have limited the operation of SVE system.

While no additional subsurface soil sampling has been conducted, the combination of free product removal and soil vapor extraction is expected to have resulted in reductions to subsurface soil hydrocarbon levels. The future institution of the in situ bioremediation aspect of the remedial action will further reduce subsurface hydrocarbon levels.

Access to the site continues to be limited by the FAA's security system to authorized FAA and FAA contractor employees.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site since the last five-year review that would affect the protectiveness of the remedy.

The groundwater cleanup standards (applicable or relevant and appropriate requirements or ARARs) identified in the Area D ROD are based on drinking water standards and New Jersey Ground Water Quality Standards (GWQS). Because of the site's location within the Pinelands Protection Area, the New Jersey GWQS (NJAC 7:9-6) consist of the natural background levels or PQLs and are defined as such in the NJPDES permit equivalent issued by the NJDEP for the discharge to groundwater at Area D. While the GWQS have changed since they were documented in the ROD, the current GWQS are documented in the NJPDES DGW permit. Therefore, the remedy is meeting current GWQS, which are more stringent than drinking water standards (both the drinking water standards defined in the ROD and current drinking water standards) and the GWQS that were documented in the ROD (see Table 2).

The soil cleanup standards identified in the Area D ROD are based on New Jersey Soil Cleanup Action Levels applicable at the time the ROD was signed. These levels included 1 ppm for total VOCs and 100 ppm for TPH in soils. These levels are more stringent than the currently applicable New Jersey Soil Cleanup Criteria (NJSCC), which include levels of 1,000 ppm for total VOCs and 10,000 ppm for total organic contaminants (including TPH). Individual compounds were also detected in soils at maximum concentrations that are below current NJSCC

(residential and non-residential) (see Table 3). Therefore, the soil standards presented in the ROD continue to be protective of human health. No new location-specific or action-specific ARARs have been identified that are not being met by the existing remedial system.

Land use at or near the site has not changed since the last five-year review and the potential routes of exposure remain the same. Groundwater has not been developed as a potable source of water at the site and there is currently no soil vapor exposure pathway. The exposure to surface soil pathway is likely not well represented by the exposure assumptions used in the original risk evaluation, since that evaluation was based on a worst-case scenario of 24 exposures per year, assuming periodic use of the fuel transfer facility that was previously located at the site. Currently, operators of the Area D treatment system are on-site on a daily basis. However, risks associated with exposures to surface soils were conservatively estimated in the HHRA based on maximum subsurface soil contaminant concentrations, since subsurface impacts were greater than surface impacts (which led to a general lack of surface soil data). Since the risks estimated based on this conservative assumption were well below acceptable risk levels, an increase in the exposure frequency would not be expected to result in unacceptable risk levels. No new contaminants, contaminant sources or unanticipated toxic byproducts of the remedy have been identified. Since the soil and groundwater cleanup standards for the remedy are more stringent than current human-health based promulgated standards and cleanup criteria, the cleanup standards are expected to remain protective of human health. While toxicity values for some of the contaminants of concern evaluated within the human health risk assessment have changed (see Table 4), these changes are not expected to impact the protectiveness of the remedy, since no site-specific, risk-based cleanup levels were used as the basis for the remedy. The remedy is progressing as expected and remains protective of human health.

An ERA conducted by the USFWS in 1996 concluded that potential risks to terrestrial receptors were minimal. Because there is no new information contradicting these conclusions, and based on the effectiveness of the remedial system in addressing groundwater contamination, the remedy remains protective of the environment. Potential risks associated with the exposure of aquatic receptors to the SBAC is currently being evaluated within a detailed ERA being conducted as part of the Area U Remedial Investigation (RI)/FS.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Area D does not currently have land use controls (LUCs), despite the fact that contaminated groundwater exceeds MCLs. In addition, the HHRA for Area D was based on a restricted land use scenario. EPA requested in correspondence dated February 26, 2002 that FAA develop a facility-wide land use control assurance plan (LUCAP) to address areas, such as Area D, where the presence of residual contamination and/or the lack of evaluation of an unrestricted (i.e., residential) use scenario in the HHRA requires the establishment and maintenance of site use restrictions. However, FAA has not responded as to whether they will be developing such a plan.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD, although capture of the downgradient edge of contamination to the south of the site must be confirmed. On-going remedial operation, maintenance and monitoring activities include periodic evaluations of the effectiveness of the remedy and additional investigations, pilot testing and/or system adjustments to optimize system operations. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. ARARs cited in the ROD remain protective of human health and, due to the lack of use of site-specific risk-based cleanup levels, changes in toxicity information are not expected to impact the protectiveness of the selected remedy.

Recommendations

The capture/treatment of downgradient shallow groundwater contamination to the south of R-1 must be demonstrated. It is also recommended that FAA develop a facility-wide LUCAP that would include appropriate LUCs for Area D.

Protectiveness Statement

The remedy for Area D, Jet Fuel Farm, is protective of the environment and will protect human health and when it is completed. Currently, there is no unacceptable exposure to human or environmental receptors from source area contaminants and none expected over the next five years.

OU02 - Area 20A - Salvage Yard Area:

History of Contamination and Initial Response

Area 20A, the Salvage Yard Area, is located in the Research and Development (R&D) portion of the FAA Technical Center, southeast of the Atlantic City International Terminal. It consists of two adjacent salvage yards associated with FAA Buildings 206 and 207. The area is approximately 1,600 feet south of the Upper Atlantic City Reservoir and was used for storage of old aircraft parts, trucks and cars, scrap metal, and empty 55-gallon drums. A site reconnaissance conducted in the early 1980s showed the presence of deteriorated and leaking drums in the northern half of the Salvage Yard Area, with evidence of past spillage (visibly-stained surface soils).

The media of concern at Area 20A include contaminated soil and contaminated groundwater. A major area of soil contamination was identified along the western edge of the Building 206 Salvage Yard, where concentrations of polychlorinated biphenyls (PCBs) and VOCs in the surface soil exceeded NJDEP Soil Action Levels. An additional area of soil contamination was identified in December 1988, when two underground waste-oil storage tanks were removed. Soil in the excavation was found to contain both PCBs and TPH at levels exceeding NJDEP Soil Action Levels.

Chlorinated VOCs are present in the groundwater. The contaminant plume in the unconfined aquifer (Upper Cohansey Sand) is generally limited to the immediate Salvage Yard Area. Chlorinated VOC contaminants were also found in the intermediate aquifer (Middle Cohansey Sand), in monitoring wells 80 to 100 feet deep located up to 500 feet from the Salvage Yard.

Basis for Taking Action

Contaminants

COCs, as identified in the HHRA for Area 20A, in each medium include:

Soils	Groundwater
1,1,1-Trichloroethane (TCA)	1,1-Dichloroethene (1,1-DCE)
Tetrachloroethene (PCE)	TCA
Toluene	PCE
DDT	bis(2-Ethylhexyl)phthalate
Aroclor-1260 (PCB)	Cadmium
Cadmium	Chromium
Chromium	

Human Health Risk Assessment

Since Area 20A was not expected to be used for any scheduled activity, the exposure frequencies used in the HHRA were restrictive. For example, exposure to surface soil was based on a maximum exposure frequency of 24 times/year. Exposure to groundwater was based on a commercial/industrial maximum exposure frequency of 250 days/year, assuming a potable well was installed at the site. Exposures to soil and groundwater at Area 20A were associated with significant human health risks, due to exceedances of EPA's risk-management criteria. PCBs in subsurface soil corresponded to noncarcinogenic risk exceedances while 1,1-DCE in groundwater resulted in carcinogenic risk exceedances.

Ecological Risk Assessment

A qualitative ERA was conducted during the EI/FS on the basis of the same COCs as the HHRA. It was surmised that PCBs and DDT concentrations in surface soils may be high enough to affect the reproduction or induce chronic toxic effects in some wildlife. An evaluation of potential ecological risks was also conducted in 1996 as part of a facility-wide ERA conducted by the USFWS. The evaluation included the collection of soil samples, earthworm bioassay samples and small mammal composite samples within the Salvage Yard Area and an evaluation of a nearby surface water sample result. Soil sample results indicated that the extent of PCB soil contamination was greater than originally expected. PCBs were also detected in the biota samples at elevated levels. Endosulfan was detected in one of three soil samples at an elevated level. The risk assessment concluded that potential risks to aquatic receptors are minimal, although potential risks to terrestrial receptors could be associated with the presence of PCBs and endosulfan in surface soils.

Remedy Selection

The ROD for Area 20A was signed on September 28, 1990. The selected remedy for Area 20A included the following components:

- Excavation of approximately 930 cubic yards of PCB-contaminated soil and transport off-site for incineration;
- Extraction of contaminated groundwater from unconfined aquifer (Upper Cohansey Sand), air stripping to remove organic compounds and reinjection upgradient of the contaminated area; and
- Extraction of contaminated groundwater from the intermediate aquifer (Middle Cohansey Sand), air stripping to remove organic compounds, and discharge to an existing borrow-pit area.

An Explanation of Significant Differences (ESD) was issued in June 1995. The primary changes documented in the ESD were:

- Revised soil cleanup criteria for PCBs; and
- Revised off-site treatment of PCB-contaminated soil from solely incineration to incineration in combination with land disposal.

Remedy Implementation and Remedial Systems

An interim remedial measure consisting of pumping and treating groundwater from the intermediate aquifer was implemented in February 1992. The extracted groundwater is treated with an air stripper and discharged to a recharge basin or via injection wells back into the intermediate aquifer. The shallow aquifer extraction system was constructed and began operation in September 1996. The extracted groundwater from the shallow aquifer is treated along with the groundwater extracted from the intermediate aquifer within the air stripper and discharged to the recharge basin or injection wells. The PCB-contaminated soil removal action began in August 1998 and was completed in September 1999, with approximately 3,500 cubic yards of PCB-contaminated soil and debris transported off-site for disposal. The volume of soil requiring remediation was greater than originally estimated because sampling conducted during the USFWS ERA indicated the extent of PCB-contaminated soils was larger than originally estimated. This was confirmed during pre-remediation sampling. Figure 3 shows the locations of recovery, observation, monitoring, and injection wells at Area 20A, as well as the location of the recharge basin.

As described previously for Area D, URS Corporation operates both the Area D and Area 20A remedial systems. The annual cost of operation for these two systems combined for each of the past five years is as follows:

OPERATING PERIOD	COST
September 13, 1998 - September 12, 1999	$1,391,000
September 13, 1999 - September 12, 2000	$1,303,000 (includes CEM upgrades)
September 13, 2000 - September 12, 2001	$1,482,000

OPERATING PERIOD	COST
September 13, 2001 - September 12, 2002	$1,532,000 (includes in situ pilot testing)
September 13, 2002 - September 12, 2003	$1,552.000
September 13, 2003 - September 12, 2004	$1,276,000 (estimated)

Systems Operations/Operation & Maintenance

The existing remedial system requires on-going operation and maintenance of the groundwater extraction, treatment and discharge systems. Temporary system shutdowns are conducted each August (as necessary) to address normal O&M activities that can only be conducted in shutdown mode.

Due to the remedial system's relative simplicity, minimal operating problems have been experienced. Over the past five years, the average rate of intermediate ground water extraction has been 240 gpm. The shallow well field extraction sump pump operates approximately twice each hour, with a maximum combined shallow and intermediate aquifer extraction rate of less than 400 gpm. Shallow groundwater is extracted from wells EW2S through EW18S, while intermediate groundwater is extracted from wells EW1 through EW3. Normal operational activities include the monitoring of the recharge basin level and the associated distribution of discharge flow between the recharge basin and injection wells. During dry periods, the recharge basin receives the entire discharge volume, with the injection wells tested on a weekly basis. During wet periods, the discharge is split between the recharge basin and the injection wells. The injection wells are redeveloped, as necessary, to maintain their discharge capacities. The plastic media within the air stripper are checked on a regular basis and have not required replacement since prior to the last five-year review.

Under the terms of the NJPDES DGW permit equivalent, the treatment system effluent must be sampled on a quarterly basis for VOCs, SVOCs, metals and total dissolved solids (TDS). The influent is also characterized on a quarterly basis for VOCs and annually for SVOCs, metals and TDS. The contaminants most commonly detected in the influent at levels exceeding PQLs include 1,1,-DCE, chloroform, TCA and PCE. A review of influent chlorinated VOC data for the period from December 1999 through February 2004 indicates that concentrations of 1,1-DCE, TCA and PCE have been decreasing over the monitoring period. Chloroform, on the other hand, has exhibited a slowly increasing trend. Effluent results have consistently been below PQLs over the entire operating period. The only parameter which consistently exceeded PQLs in both the influent and effluent over the past five years is TDS. Influent levels over the period ranged from non-detectable (with a minimum detection limit equal to the PQL of 10,000 ppb) to 53,300 ppb. Effluent levels ranged from non-detectable to 66,700 ppb.

In May 2002, the FAA conducted a pilot test involving the injection of Hydrogen Release Compound (HRC®) into the shallow aquifer, immediately upgradient of wells 20A-MW1S, 20A-MW4S, and 20A-MW12S, to determine if cleanup of the site could be accelerated through in situ treatment mechanisms. When in contact with subsurface moisture, HRC® releases lactic acid, which is metabolized by naturally occurring anaerobic microbes, thereby producing low

concentrations of dissolved hydrogen. The dissolved hydrogen is then used by other subsurface microbes to strip solvent molecules (e.g. PCE, trichloroethene (TCE) and TCA) of their chlorine atoms and allow for further biological degradation. Three observations wells (HRC-1, HRC-2 and HRC-3) were installed just downgradient of well 20A-MW4S to assist in the evaluation of the effectiveness of the test. A baseline round of groundwater sampling was conducted prior to HRC® injection, followed by additional sampling rounds one week, one month, two months and three months after injection. Monitoring parameters included VOCs, metabolic products (e.g., lactic, acetic and pyruvic acids) and attenuation factors such as DO, ORP and others. The greatest decrease in chlorinated VOC concentrations was observed in wells 20A-MW4S, HRC-2 and HRC-3, along with evidence that the intended biochemical reactions were occurring (e.g., decreased DO, decreased ORP and increased dissolved hydrogen). Decreases of smaller magnitude were observed at 20A-MW12S and HRC-1. No decrease in the concentrations of three of six target compounds was observed at 20A-MW1S. It was hypothesized that the greater presence of subsurface clay layers in this portion of the site resulted in an uneven distribution of the HRC® after injection in this area.

Overall the combined operation of the treatment systems at Area D and Area 20A has fallen within the allocated budget. The only significant unusual cost over the past five-year period was the performance of the HRC® study. The cost associated with that study was previously listed in the Area D System Operations discussion.

Data Review

Groundwater Monitoring

As part of the operation and maintenance of the remedial systems at Area 20A, the FAA conducts regular monitoring of groundwater in the vicinity of the intermediate groundwater plume, the infiltration basin, and the intermediate aquifer injection wells.

Monitoring of the intermediate extraction wells (EW-1, EW-2 and EW-3) conducted since the last five-year review indicates that five chlorinated VOCs have been detected at levels exceeding PQLs: 1,1-DCE, chloroform, TCA, TCE and PCE. In general, the chlorinated VOCs have exhibited decreasing concentration trends over the five-year period. The only exceptions to this statement are with respect to chloroform in EW-1, and 1,1-DCE and TCE in EW-3.

The intermediate monitoring wells in the vicinity of the intermediate groundwater plume have also generally exhibited decreasing concentration trends for these five compounds. The only exceptions are chloroform in well DMW3 and 1,1-DCE and TCA in well MW-5D (which is located upgradient of the extraction wells). Wells ACMUA-8S and ACMUA-8D did not exhibit detectable levels of any chlorinated VOCs over the five-year period.

Under the terms of the NJPDES DGW permit, shallow groundwater quality in the vicinity of the recharge basin and intermediate groundwater quality in the vicinity of the injection wells is also monitored. In the shallow monitoring wells (SMW-1, SMW-2 and SMW-3), TDS is the only parameter that has been detected above PQLs. In the intermediate monitoring wells (IAMW-1,

IAMW-2, IAMW-3, IAMW-4 and IAMW-5), chloroform and TDS have been regularly detected at levels exceeding PQLs.

Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The soil remedial action is complete. The ground water extraction wells appear to be adequately capturing the dissolved groundwater contamination plume (in the unconfined and intermediate aquifers), and the air-stripping tower appears to be effectively removing VOCs from the extracted groundwater. Effluent limitations stipulated in the NJPDES DGW permit equivalent are generally achieved by the treatment system. TDS has been detected in the air stripper effluent at levels exceeding PQLs but its presence in the influent at levels exceeding PQLs indicates that it may be attributable to background conditions. While TDS is a monitoring requirement of the NJPDES DGW permit, it was not a required parameter of the baseline monitoring for the treatment system, so baseline TDS conditions were not defined prior to start-up of the remedial system. Chloroform has been detected at levels exceeding PQLs in the intermediate monitoring wells near the injection wells, but its absence in the treatment system effluent at levels exceeding PQLs and the prevalence of chloroform at other areas of concern at the FAA Technical Center (e.g., at nearby Area A) indicate that the detection of chloroform in the intermediate wells is not site-related.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site since the last five-year review that would affect the protectiveness of the remedy.

The groundwater ARARs defined in the Area 20A ROD are based on drinking water standards and New Jersey GWQS. Because of the site's location within the Pinelands Protection Area, the New Jersey GWQS consist of the natural background levels or PQLs and are defined as such in the NJPDES DGW permit equivalent issued by the NJDEP for the discharge to groundwater at Area 20A. While the GWQS have changed since they were documented in the ROD, the current GWQS are documented in the NJPDES DGW permit. Therefore, the remedy is meeting current standards. With the exception of bis(2-ethylhexyl)phthalate, the current GWQS are more stringent than drinking water standards (both the drinking water standard levels defined in the ROD and current drinking water standards) (see Table 5). Influent, effluent and groundwater monitoring at Area 20A has not identified the presence of bis(2-ethylhexyl)phthalate at levels exceeding either the PQL or the MCL in the groundwater at Area 20A, so the remedy continues to be effective.

The soil cleanup standards identified in the Area 20A ROD are based on New Jersey Soil Cleanup Action Levels applicable at the time the ROD was signed. These levels included 1 ppm for total VOCs and 100 ppm for TPH in soils. Individual compounds detected in soil samples at levels exceeding these action levels included PCE and toluene. These action levels are more stringent than the currently applicable NJSCC, which include levels of 1,000 ppm for total VOCs

and 10,000 ppm for total organic contamination (including TPH), and are more stringent than the current NJSCC for PCE and toluene (see Table 6). The ROD also included PCB soil cleanup levels of 5 ppm for the 0- to 6-inch interval and 25 ppm for greater soil depths. The Area 20A ESD included a cleanup standard for PCBs in surface soil of 2 ppm based on the NJSCC and this standard has not changed since the ESD was signed. The NJSCC for PCBs based on impact to groundwater is 50 ppm, which is of concern with respect to subsurface soils, is greater than the remedial criterion for subsurface soils defined in the ROD. Therefore, the soil standards presented in the ROD and ESD continue to be protective of human health. No new location-specific or action-specific ARARs have been identified that are not being met by the existing remedial system.

Land use at or near the site has not changed since the last five-year review and the potential routes of exposure remain the same. Groundwater has not been developed as a potable source of water at the site and there is currently no soil vapor exposure pathway. Also, no new contaminants or contaminant sources have been identified.
The assumption used in the original HHRA to evaluate the worst-case exposure to surface soil pathway was 24 exposures per year, based on periodic activities conducted in the Salvage Yard Area. In 2002, the site was proposed to be redeveloped as a training center for Federal Air Marshals. This change in land use was not compatible with the original soil exposure assumptions. In addition, the potential construction activities associated with this development could result in exposures to PCBs in subsurface soil at concentrations up to 25 ppm and could adversely impact physical components of the groundwater remedy for Area 20A, which would need to be protected.

As a result of the proposed change in land use at Area 20A, EPA requested that FAA update the original risk assessment, deal appropriately with elevated PCB levels in subsurface soil, and protect groundwater extraction wells that are a component of the groundwater remedy. The FAA responded by stating that, as a result of the removal action, the residual levels of the contaminants of concern (PCBs and DDT) in surface soil at Area 20A were below non-residential NJSCC. Regarding PCBs in subsurface soils, the FAA committed to a construction program that would include a construction-worker health and safety program, a soil sampling/management program to ensure that elevated levels of subsurface contaminants were not brought to the surface during construction, and the protection of still-active components of the Area 20A remedy (e.g., shallow extraction wells) physically located within the proposed development area both during and after construction. Plans to construct the Air Marshal training center were subsequently abandoned and current site use remains unchanged.

1,4-Dioxane is a man-made compound used as a stabilizer in TCA that is very mobile in groundwater. Since the ROD and ESD were signed, improvements to chemical analytical methodologies have made it possible to reliably detect this compound. While there is no MCL established for this compound, it is classified by EPA as a probable human carcinogen, can be persistent when present in groundwater and is not effectively treated by air stripping. Therefore, it may be present in association with the TCA in the groundwater at Area 20A.

Since the soil and groundwater cleanup standards for the remedy are equivalent to or more stringent than human-health-based promulgated standards and cleanup criteria, the cleanup

standards are expected to remain protective of human health. While toxicity values for some of the contaminants of concern evaluated within the HHRA have changed (see Table 7), these changes are not expected to impact the protectiveness of the remedy, since no site-specific, risk-based cleanup levels were used as the basis for the remedy. The soil remedy is complete and remains protective of human health. The groundwater remedy is progressing as expected and also remains protective of human health.

Baseline ecological risks were evaluated based on pre-remedial concentrations of surface soil contaminants, with PCBs and endosulfan identified as potentially posing risk to ecological receptors. The potential endosulfan risk was based on the detection of endosulfan in one of three USFWS ERA soil samples, which also exhibited PCBs at an elevated level. Endosulfan was not detected in the soil samples collected during the EI. Given that the PCB-contaminated soils were removed from the site, the soil represented by the sample that contained the elevated level of endosulfan was remediated with the PCB-contaminated soils. While a specific evaluation of the ecological protectiveness of the soil cleanup standards was not conducted, the potential risks associated with these contaminants have been reduced through the implementation of the soil remedial action.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

The HHRA for Area 20A did not assess a residential land-use scenario, the soil removal that took place at the site was based on non-residential NJSCC, and groundwater contamination exceeds MCLs. Consequently, LUCs are required at Area 20A to restrict land and groundwater use. As previously mentioned, EPA has requested that FAA develop a facility-wide LUCAP to address areas such as Area 20A where the presence of residual contamination and/or the lack of evaluation of an unrestricted (i.e., residential) use scenario in the HHRA requires the establishment and maintenance of site use restrictions. However, FAA has not responded as to whether they will be developing such a plan.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD/ESD. On-going remedial operation, maintenance and monitoring activities include periodic evaluations of the effectiveness of the remedy and additional investigations, pilot testing and/or system adjustments to optimize system operations. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. ARARs cited in the ROD/ESD remain protective of human health and, due to the lack of use of site-specific risk-based cleanup levels, changes in toxicity information are not expected to impact the protectiveness of the selected remedy.

Recommendations

It is recommended that FAA develop a facility-wide LUCAP that would include appropriate LUCs for Area 20A. Based on the potential presence of 1,4-dioxane in the groundwater in association with the chlorinated organic compounds, it is recommended that the FAA conduct

testing of the contaminated groundwater to determine if 1,4-dioxane is a potential concern at this site.

Protectiveness Statement

The remedy for Area 20A, the Salvage Yard Area, is protective of the environment and will protect human health when it is completed. Currently, there is no unacceptable exposure to human or environmental receptors from source area contaminants and none expected over the next five years.

OU3 - Area G - Transformer Storage Area:

A ROD was signed September 30, 1992 to document the decision of no further action. Two non-time critical removal actions of PCB-contaminated soil and concrete took place in the fall of 1989 and the spring of 1990. Approximately 62 tons of excavated soil and concrete were disposed of off-site in an approved TSCA facility. The average concentration of PCBs in post-remediation samples was 0.479 ppm which is below the residential NJSCC. Consequently, the site is suitable for unrestricted use and LUCs are not required. Therefore, Area G, the Transformer Storage Area, will not be further considered in this five-year review.

OU04 - Area C, H, and M - Butler Aviation Fuel Spill, Salvage Yard Near Sewage Treatment Plant, and Bldg. 202 Gelled Fuel Test Area:

Area C, Butler Aviation Fuel Spill

History of Contamination and Initial Response

Area C, referred to as the Butler Aviation Fuel Spill Area (although it is not the actual site of the spill), is located on FAA property. It is south of adjacent land owned by Atlantic City that was used by Butler Aviation as an underground storage facility for jet fuel until 1993, at which time the underground storage tanks were removed and replaced with aboveground storage tanks. In 1984 and 1986, fuel spills occurred onto surface soil next to the filling pad at the Butler Aviation Fuel Farm. A soil and groundwater investigation at the Butler Aviation Fuel Farm indicated the presence of residual contamination, including a free-floating fuel product on the groundwater surface. However, site investigation results indicated that groundwater contaminants have not been detected in the Butler monitoring wells located closest to Area C.

Basis for No Action with Continued Monitoring

Based on the results of the Phase I and II EI groundwater sampling conducted in June 1987 and December 1988, respectively, it was determined that hydrocarbon contamination had not migrated from the Butler Aviation area onto FAA property. Additional groundwater sampling in November 1992 confirmed these results. Quarterly groundwater monitoring at Area C continues to verify that contamination does not migrate onto FAA property from the adjacent Butler Aviation area. A review of the soil samples taken at Area C indicate no exceedances of

residential NJSCC. In addition, groundwater monitoring has not indicated that exposure restrictions to groundwater are required. Consequently, no LUCs are required for Area C.

Area H, Salvage Yard Near Sewage Treatment Plant

History of Contamination and Initial Response

Area H is a former salvage yard located north of the former sewage treatment plant, adjacent to Area B (the Navy Fire Test Facility). At Area H, a fenced-in salvage yard was used beginning in the late 1950s and continuing through the early 1960s. From the early 1960s through the beginning of the 1990s, the area was used as a storage area primarily for scrap metal and cable. Currently, the fencing for the yard has been removed and no materials are stored within the area.

Basis for No Action

Analytical results from the EI indicated that the use of the area as a salvage yard did not appear to have impacted soil in the area. Additional site investigations conducted in November 1992 did not detect VOCs in surface soil samples. A review of the soil samples taken at Area H indicate no exceedances of current residential NJSCC. Consequently, no LUCs are required and Area H will not be further considered in this five-year review.

Area M, Building 202 Gelled Fuel Test Area

History of Contamination and Initial Response

Area M, Building 202 Gelled Fuel Test Area, is located adjacent to Building 202 in the R&D Area south of the Upper Atlantic City Reservoir. Gelled fuel testing was conducted beginning in 1970 and continued for approximately four years. Anti-misting characteristics of gelled fuels were measured at the area by impacting one-gallon plastic bags of Jet-A fuel against wire grates while providing an ignition source. Any residual or unburned fuels were deposited on an asphalt pad or on the adjacent ground.

Basis for No Action

Initially, ten surface soil samples were collected and analyzed for TPH and two surface soil samples were analyzed for Priority Pollutants (PP). Polynuclear aromatic hydrocarbons (PAHs) were detected at a maximum total concentration of 2.1 ppm, which is below current NJSCC. One soil sample contained TPH at a level of 160 ppm, which exceeded the 100 ppm NJDEP soil action level that was applicable at that time. Three additional surface soil samples were collected for TPH analysis in the area where the New Jersey Soil Action Level for TPH was exceeded. The additional samples failed to confirm the presence of TPH concentrations above the 100 ppm NJDEP Soil Action Level.

In November 1992, two additional surface soil samples were collected, one from the area where a previous sample exhibited TPH at a level exceeding the NJDEP Soil Action Level and one from a grassy area just south of the paved area, where unburned fuels were thought to have

potentially drained onto the soil. The additional investigation confirmed that no VOCs are present at either surface soil sample location. On the basis of the sampling results and the nature of contaminants detected in Area M soils, no ground water investigations were conducted at Area M. A review of the soil samples taken at Area M indicate no exceedances of current residential NJSCC. Consequently, no LUCs are required and Area M will not be further considered in this five-year review.

Remedy Selection

The ROD for Areas C, H and M was signed on September 30, 1994. The selected remedy for Areas C, H and M is no further action with continued groundwater monitoring at Area C. The ROD states that groundwater monitoring at Area C will continue until Butler Aviation is no longer a potential source of contamination to Area C.

Remedial Implementation and Remedial Systems{tc "Remedial Implementation and Remedial Systems"}

Implementation activities are strictly limited to the quarterly groundwater sampling conducted at Area C. The annual cost of sampling at Area C is approximately $15,000 per year.

System Operations and Maintenance{tc "System Operations and Maintenance"}

Not applicable; no active remedy.

Data Review{tc "Data Review"}

Groundwater Monitoring

Since the last five-year review, groundwater monitoring at Area C has not identified any constituents present at levels exceeding PQLs/MCLs. Therefore, there has been no evidence of on-site migration of Butler Aviation-related groundwater contamination.

Technical Assessment{tc "Technical Assessment"}

Question A: Is the remedy functioning as intended by the decision documents?

Quarterly groundwater monitoring at Area C has confirmed the absence of contamination. Areas H and M are “no further action.”

Question B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives used at the time of the remedy still valid?

Since each of Areas C, H and M are no further action areas, with the monitoring conducted at Area C intended to simply verify the absence of contamination, such factors are not a consideration.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Continued groundwater monitoring at Area C has verified the continued absence of contamination at the site.

Technical Assessment Summary

According to the data reviewed and the interviews conducted, Areas C, H and M continue to be suitable for unrestricted use.

Recommendations

The ROD for Area C indicates that groundwater monitoring at Area C will continue until Butler Aviation is no longer a potential source of contamination to Area C. However, the most recent groundwater data for the Butler Aviation site available to the FAA was dated 1991. This data was provided by NJDEP in 1994, at which time NJDEP documented that Butler Aviation was not currently and had not historically discharged contamination to Area C. The FAA should pursue additional site information from NJDEP to determine if continued groundwater monitoring is necessary at Area C. If it can be documented that the Butler Aviation site is no longer considered a potential source of contamination to Area C, discontinuation of groundwater monitoring at Area C would be warranted.

Protectiveness Statement{tc "Protectiveness Statement"}

The remedy of "no further action" with groundwater monitoring at Area C remains protective of human health and the environment at Areas C, H and M.

OU05 - Areas I and Q - Former Incinerator Building and Fire Station:

Area I - Former Incinerator Building

History of Contamination and Initial Response

Area I, the Former Incinerator Building, is located northwest of the former sewage treatment plant, near Area B (the Navy Fire Test Facility). A small incinerator located at this site was used to burn domestic trash during the 1940s and 1950s, when the Naval Air Station occupied the area. The incinerator was demolished in the late 1960s.

Basis for No Action

Soil samples were collected at three locations during the site investigations. While ash and cinders were identified in the soils at the site, only low levels of metals were detected in the soil samples. On the basis of the sampling results and nature of the contaminants, no ground water investigations were conducted at Area I. Maximum metals levels were also below current

residential NJSCC. Consequently no LUCs are required and Area I will not be further considered in this five-year review.

Area Q - Fire Station

History of Contamination and Initial Response

Area Q, the Fire Station Area, is located north of the existing Fire Station, near the FAA hangar in the central portion of the facility and south of the major east-west runway. Fire training was conducted at the site from 1976 through the late 1980s. Training was conducted by burning jet fuel, waste oils and other materials in a 6-foot diameter, 4-inch high steel pan. In late 1986 and 1987, gasoline was used to ignite microfiche, aircraft seats and various other materials. A section of plane fuselage was also used in fire training activities at the site.

Basis for No Action

Five soil borings were drilled at Area Q, with two soil samples collected from each boring for TPH analysis. The analytical results ranged from 2.5 ppm to 32 ppm TPH. On the basis of the sampling results, no ground water investigations were conducted at Area Q. The detected TPH levels are below current residential NJSCC. Therefore, no LUCs are required and Area Q will not be further considered in this five-year review.

OU06 - Areas 29 and K - Fire Training Area and Storage Area:

History of Contamination and Initial Response

Area 29, Fire Training Area

Area 29, referred to as the Fire Training Area, is located northeast of the Atlantic City International Airport runways and southwest of White Horse Pike. The site was constructed in the early 1970s for the training of airport fire-fighting personnel. The facility consisted of a circular burn area approximately 150 feet in diameter, a small concrete burn pad, two aboveground fuel tanks on a small hill, and two underground tanks for the collection of runoff from the burn pads. Full-scale aircraft test burns were conducted on the large circular burn area, while smaller fuel fires were extinguished on the concrete pad. An underground drain system was used to collect runoff from the circular burn area and to divert it to a 10,000-gallon underground circular storage tank. Runoff from the concrete pad was collected in a 5,000-gallon underground storage tank. Both of these tanks were emptied, removed, and disposed of off site in December 1988.

Area K, Storage Area

Area K, referred to as the Storage Area Near Area 29, is located northwest of the test burn areas at Area 29. Aerial photographs taken in 1974 and 1983 show that drums and tanks were once stored in this area. The drums were removed by the fall of 1986 and were also disposed of off site.

Basis for Taking Action

The EI identified the presence of contaminants in surface soil, subsurface soil, and groundwater at Areas 29 and K. PCBs and TPH were detected in surface and subsurface soils at levels exceeding non-residential NJSCC. Three areas of soils containing elevated PCB levels were identified: within the circular burn area, adjacent to the concrete burn pad, and in the former drum storage area (Area K). A total of 350 cubic yards of contaminated soil was estimated to exceed non-residential NJSCC for PCBs. A total volume of 50 cubic yards of contaminated subsurface soil was estimated to exceed the NJSCC for total VOCs.

VOCs were detected in perched groundwater at levels exceeding state or federal MCLs or New Jersey GWQS (PQLs). Perched groundwater is located above a low-permeability clay layer that separates the perched groundwater from the true water table aquifer in a portion of the site.

Contaminants

COCs, as identified in the HHRA for Area 29 and Area K, in each medium include:

Soil	Groundwater
Benzene	Benzene
PCBs	1,1-Dichloroethane
	Toluene
	bis(2-Ethylhexyl)phthalate

Human Health Risk Assessment

Since Areas 29 and K were not expected to be used for any scheduled activities, the exposure frequencies used in the risk assessment were restrictive. For example, exposure to surface soil was based on a maximum exposure frequency of 24 times/year. Exposure to groundwater was based on a commercial/industrial maximum exposure frequency of 250 days/year, assuming a potable well was installed at the site. Exposures to soil and groundwater at Areas 29 and K were associated with significant human health risks, due to exceedances of EPA's risk-management criteria. Carcinogenic-risk exceedances associated with exposure to groundwater were due primarily to benzene and 1,1-dichloroethane, while noncarcinogenic risk exceedances were due primarily to benzene. Exposures to soil did not result in unacceptable risks.

Ecological Risk Assessment

A qualitative ERA was conducted on the basis of the same COCs as the HHRA. Since PCBs are persistent in the environment, tend to bioaccumulate, and can cause reproductive and behavioral changes in animals, it was surmised that concentrations of PCBs in surface soils may be high enough to affect the reproduction and behavior of some wildlife. An evaluation of potential ecological risks was also conducted in 1996 as part of a facility-wide ERA conducted by the USFWS. The evaluation included the collection of soil samples, earthworm bioassay samples

and small mammal composite samples along the fringes of the areas of known contamination and the evaluation of a surface water sample collected near Area 29. Cadmium and mercury were detected at elevated levels in earthworms collected from a drainage swale near a culvert and resulted in predicted risks to higher trophic species.

Remedy Selection

The ROD for Areas 29 and K was signed on September 20, 1996. The remedial action objectives (RAOs) listed in the ROD are as follows:

- Eliminate exposures to PCB-contaminated soils at levels which exceed state or federal cleanup levels;
- Reduce concentrations of TPH in subsurface soils to prevent continued leaching of contaminants into groundwater;
- Prevent the migration of VOCs in perched groundwater to deeper aquifer systems;
- Reduce contaminant concentrations in the perched groundwater system to acceptable levels; and
- Reduce human health risks posed by the site in accordance with state and federal remediation goals.

The selected remedy for Areas 29 and K includes the following components:

- Excavation of approximately 350 cubic yards of PCB-contaminated soil and transport off site for disposal at a licensed facility;
- Excavation of approximately 50 cubic yards of TPH-contaminated soil and transport off site for disposal at a licensed facility;
- Demolition and excavation of debris from the former circular burn area and concrete burn pad and transport off site for disposal;
- Extraction of perched ground water and on-site treatment using carbon adsorption and/or other treatment processes to remove VOCs. Treated ground water will be recharged to the subsurface in the vicinity of the site; and
- Establishment of a Declaration of Environmental Restrictions where constituents of concern in soil exceed the residential NJSCC, to prevent development of the site for residential use.

Remedial Implementation and Remedial System

Excavation and off-site disposal of 4,090 cubic yards of contaminated soils was completed in December 2001. The excavated soils included 2,890 cubic yards of PCB-contaminated soil, 815 cubic yards of TPH-contaminated soil, and 385 cubic yards of mixed PCB-and TPH-contaminated soil. Demolition removal and off-site disposal of debris from the circular burn pad and the former concrete pad has also been completed. The groundwater treatment system became operational in July 2004. Figure 4 shows the locations of recovery, observation and monitoring wells at Area 29, as well as the location of the infiltration gallery.

The cost of the excavation and disposal of the contaminated soils and the construction of the groundwater treatment system was approximately $8,400,000. The anticipated annual treatment costs (i.e., annual operation and maintenance costs) at Area 29 are approximately $720,000.

System Operations and Maintenance

The groundwater remediation system began regular operation and maintenance activities in July 2004. During startup of the system, problems were encountered with respect to meeting total dissolved solids (TDS), zinc, iron and manganese discharge limits. These problems have been addressed in part through equipment adjustments and additional studies will be conducted, as necessary, to determine further how these limitations can be met. Once operating on a normal basis, the system will require regular operation and maintenance of the groundwater extraction system, the groundwater treatment system including filtration, carbon adsorption and sludge dewatering units, and the groundwater infiltration galleries.

Data Review

Groundwater Monitoring

The last round of quarterly groundwater monitoring was conducted at Areas 29 and K in April 2000, with the subsequent commencement of soil and groundwater remedial construction activities at the site. Additional groundwater monitoring (based on PP analyses) was conducted in early February 2002 to define baseline groundwater quality conditions prior to the initiation of groundwater remedial activities, in accordance with anticipated NJPDES DGW permit equivalent requirements. Supplemental NJPDES baseline groundwater sampling was conducted in May 2003 to provide baseline groundwater quality results for those target compound list/target analyte list (TCL/TAL) analytes that were not covered by the original PP analyses, in accordance with the actual requirements of the NJPDES DGW equivalent (which was received on February 14, 2002). Per NJPDES DGW requirements, groundwater samples were also collected in February 2004, prior to startup of the remediation system, and again in April 2004, during the shakedown period of treatment system operation.

The quarterly groundwater monitoring conducted subsequent to the last five-year review (i.e., between September 1999 and April 2000) confirmed previous monitoring results, indicating that groundwater in the perched zone exceeds GWQS while the quality of groundwater in the true water table continues to be in compliance with applicable standards, with the only exception being the detection of chloroform at levels exceeding the PQL in the true water table aquifer at well 29-MW4S during the three quarters of sampling following September 1999.

The February 2002 baseline groundwater monitoring confirmed the continued presence of VOCs, SVOCs and metals above PQLs in the perched groundwater samples. Shallow groundwater quality in the area of the infiltration galleries (the NJPDES DGW permit compliance point) was found to be in compliance with PQLs for VOCs, SVOCs and PCBs, although several samples contained select metals (including arsenic, chromium, lead and zinc) at levels exceeding PQLs. Based on these results, FAA requested that, in accordance with the New Jersey GWQS, these background levels be considered as treatment system effluent limits for the discharge to ground water. The sampling also confirmed that PQLs are not exceeded in the true water table aquifer downgradient of the contaminated zone. The only contaminants detected

above PQLs in well 29-MW4S, which historically exhibits occasional exceedances of certain VOCs and metals, were chromium and nickel.

The May 2003 supplemental baseline groundwater monitoring confirmed the February 2002 baseline results while also identifying additional metals (including aluminum, iron, manganese and sodium) that were present at levels exceeding the PQLs in the vicinity of the infiltration galleries. Based on these results, the FAA requested NJDEP's concurrence with the use of the background levels as effluent limits for those constituents detected above PQLs in background samples. NJDEP offered preliminary acceptance of the background levels as discharge limits in a June 2004 e-mail and will be documenting this in a forthcoming memo.

Prior to and during the shakedown period of treatment system startup, select wells, including extraction wells, were sampled. The sampling, conducted in February and April 2004, confirmed the presence of benzene, toluene, ethylbenzene and total xylenes in the extraction wells and other perched groundwater wells. PCBs were detected in perched groundwater at well 29-MW15S at a level exceeding the PQL in February but were not detected in this well in April. 1,2-Dichloroethane was detected during both rounds in true water table well 29-MW1S at levels exceeding the PQL; it has historically been detected at or below the PQL level in this well. Chloroform was detected in one round at true water table well 20-MW16S, near the infiltration galleries, at a level exceeding the PQL; it had previously been detected in this well at levels below the PQL.

Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The soil excavation and demolition components of the remedy have been completed as described in the ROD for Area 29. The groundwater remediation system started operating in July 2004.

Access to the site continues to be limited by the FAA's security system to authorized FAA and FAA contractor employees.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

Demolition activities associated with the remedial actions have resulted in the removal of previously existing structures at the site, PCB- and TPH-contaminated soils have been removed in accordance with the cleanup levels established in the ROD, and a new groundwater treatment building has been erected at the site. In other ways, no changes in physical conditions of the site have occurred that would affect the protectiveness of the remedy. Also, no new contaminants or contaminant sources have been identified.

The cleanup level for the removal of surficial PCB-contaminated soils was based on non-residential NJSCC. Consequently, the site is suitable for future industrial/commercial use. The groundwater treatment facility will require periodic visits by a treatment plant operator. A potable well has not been installed at the site; therefore, no exposures to contaminated

groundwater (via ingestion) are occurring and the exposure assumptions in the ROD are still valid. In addition, there is currently no soil vapor exposure pathway.

The groundwater ARARs defined in the Area 29 ROD are based on drinking water standards and New Jersey GWQS. Because of the site's location within the Pinelands Protection Area, the New Jersey GWQS consist of the natural background levels or PQLs and are defined as such in the NJPDES DGW permit equivalent issued by NJDEP for the discharge to groundwater at Area 29. These standards are still current and are equal to or more stringent than drinking water standards (both the drinking water standard levels defined in the ROD and current drinking water standards) (see Table 8).

The soil cleanup standards identified in the Area 29 ROD are based on NJSCC applicable at the time the ROD was signed. These levels included 2 ppm for PCBs (based on non-residential exposures) and 10,000 ppm for total organic compounds in soils. These soil cleanup criteria have not changed since the ROD was signed (see Table 9). Therefore, the soil standards presented in the ROD continue to be protective of human health. No new location-specific or action-specific ARARs have been identified that are not being met by the existing remedial system.

TCA has periodically been detected in Area 29 groundwater, generally at low concentrations. It was detected twice in the perched groundwater at well 29-MW2S, at a level of 100 ppb in June 1987 and at a level of 57 ppb in June 1997. It has also been occasionally detected in other wells (29-MW1S, 29-MW4S, 29-MW5S) at levels of 4 ppb or less. The specific source of the TCA contamination is not known, but is most likely related to the fire training activities that occurred at this site. While the compound 1,4-dioxane may be associated with TCA contamination, the relatively low levels of TCA only occasionally detected at this site do not warrant further investigation of the potential presence of 1,4-dioxane at this time.

Since the soil and groundwater cleanup standards for the remedy are equivalent to or more stringent than human-health-based promulgated standards and cleanup criteria, the cleanup standards are expected to remain protective of human health. While toxicity values for some of the contaminants of concern evaluated within the HHRA have changed (see Table 10), these changes are not expected to impact the protectiveness of the remedy, since no site-specific, risk-based cleanup levels were used as the basis for the remedy. The soil remedy is complete and remains protective of human health. The groundwater remedy is progressing as expected and also remains protective of human health.

Baseline ecological risks were evaluated based on pre-remedial concentrations of surface soil contaminants. While a specific evaluation of the ecological protectiveness of the soil cleanup standards was not conducted, the potential risks associated with these contaminants have been reduced through the implementation of the soil remedial action.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

The HHRA for Areas 29 and K did not include an unrestricted land-use scenario. In addition, the cleanup level for PCBs was based on the non-residential NJSCC. Consequently, LUCs are required at Areas 29 and K to restrict residential development and restrict groundwater use. The ROD stipulated that a Declaration of Environmental Restrictions, in accordance with NJAC regulations defined at 7:26E, be established to prevent residential use at the site but this has not yet been established (it must reflect post-remediation residual contamination levels and therefore was delayed pending completion of the soil remedial action). EPA has requested that FAA develop a facility-wide LUCAP to address areas where the presence of residual contamination and/or the lack of evaluation of an unrestricted (i.e., residential) use scenario in the HHRA requires the establishment and maintenance of site use restrictions. To date, FAA has not responded as to whether they will be developing such a plan.

True water table aquifer monitoring well 29-MW4S has historically exhibited occasional exceedances of certain VOC and metals groundwater quality criteria. Monitoring results for this well should continued to be reviewed to verify that groundwater contamination has not migrated from the perched zone to the true water table. True water table aquifer monitoring well 29-MW1S should also continue to be monitored, based on recent detections of 1,2-dichloroethane above PQLs in that well. Perched groundwater quality at well 29-MW15S should continue to be monitored to determine if the one-time detection of PCBs above PQLs in that well was truly representative of groundwater quality at that location.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD. Some problems developed during startup with respect to meeting discharge criteria for the groundwater treatment system, but efforts are currently being made to ensure compliance with the discharge criteria There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. ARARs cited in the ROD remain protective of human health and, due to the lack of use of site-specific risk-based cleanup levels, changes in toxicity information are not expected to impact the protectiveness of the selected remedy.

Recommendations

It is recommended that FAA develop a facility-wide LUCAP that will include appropriate LUCs for Areas 29 and K.

Groundwater quality at true water table wells 29-MW4S and 29-MW1S and perched water table well 29-MW15S should continue to be monitored, based on occasional detections of certain constituents above PQLs in the past in these wells.

Protectiveness Statement

The remedy for Area 29, Fire Training Area and Area K, Storage Area, is protective of the environment and will protect human health when it is completed. Currently, there is no

unacceptable exposure to human or environmental receptors from source area contaminants and none expected over the next five years.

OU07 - Area 41 - Fuel Farm & Photo Lab:

History of Contamination and Initial Response

Area 41, referred to as the Fuel Farm and Photo Lab Area, is characterized by a former aviation gasoline (AVGAS) Fuel Farm and a former photographic laboratory area. The AVGAS Fuel Farm includes five concrete underground storage tanks installed in the mid-1940s, of which three had a 50,000-gallon capacity and two had a 100,000-gallon capacity. All of the tanks were closed in-place in 1999.

The site also features an existing 6,200-square-foot depression area (a remnant of an historic impoundment area) and three drainage ditches referred to as Drainage Ditches 1, 2, and 3. Wetland areas have been delineated at the site in the vicinity of the drainage ditches.

Historically, the site has seen various uses. While originally used for the underground storage of AVGAS, the Fuel Farm at Area 41 was later used for stockpiling #2 and #4 fuel oil. A photographic laboratory was formerly located to the northwest of the Fuel Farm. The lab discharged process wastewater via an underground pipe to Drainage Ditch 1 until the mid-1970s. Historical aerial photographs indicate that the existing ponded area at the end of Drainage Ditch 1 may have been larger in the past and that, for a time, it may have drained into a larger impoundment (referred to as Former Impoundment B) to the east. In addition, a second impoundment area (referred to as Former Impoundment A) was historically located in the southern portion of the site, near the beginning of Drainage Ditch 2. Figure 5 shows the locations of these historic features. Based on interviews of NJANG personnel conducted under a separate NJANG study, more than 10,000 gallons of jet fuel (JP-4) and AVGAS (115/145) may have been drained from tank trucks onto the ground in the vicinity of Former Impoundment A during truck washing activities. No visible evidence of the historic presence of Impoundments A and B currently exists at the site.

Basis for Taking Action

Besides groundwater contamination, floating product and surface soil, subsurface soil and sediment contamination exist at Area 41. A floating hydrocarbon product was identified in a shallow monitoring well in the Former Impoundment A area during the EI. Ongoing product thickness measurements taken during quarterly groundwater sampling have not subsequently identified a significant product layer (>0.1 feet) in this well. The detection of organic vapors and observed staining of subsurface soils at the soil boring locations allowed for the delineation of an area of subsurface contamination near Former Impoundment A. A floating product layer was also detected in a well in the Fuel Farm area in May 1993.

Contaminants

COCs, as identified in the HHRA for Area 41, in each medium include:

Soil	Groundwater
Chlorobenzene	Chlorobenzene
Ethylbenzene	Ethylbenzene
Toluene	Toluene
Benzo(a)anthracene	Bis(2-ethylhexyl)phthalate
Benzo(a)pyrene	2,4-Dimethylphenol
Benzo(b)fluoranthene	4,4-DDD
Bis(2-ethylhexyl)phthalate	Antimony
Butylbenzylphthalate	Arsenic
Chrysene	Beryllium
Di-n-butylbenzylphthalate	Cadmium
Fluoranthene	Chromium
Phenanthrene	Copper
Phenol	Lead
Pyrene	Mercury
PCBs (Aroclor 1248/1254)	Nickel
4,4-DDT	Selenium
Arsenic	Zinc
Chromium	
Copper	
Lead	
Mercury	
Nickel	
Silver	
Zinc	

Human Health Risk Assessment

Since Area 41 is not expected to be used for any scheduled activities, the exposure frequencies used in the risk assessment were restrictive. For example, exposure to surface soil was based on a maximum exposure frequency of 24 times/year. Exposure to groundwater was based on a commercial/industrial maximum exposure frequency of 250 days/year, assuming a potable well was installed at the site and assuming ingestion of the floating hydrocarbon product, which was characterized during the EI. Exposures to groundwater at Area 41 are associated with significant human health risks, due to exceedances of EPA's risk-management criteria. Both carcinogenic and noncarcinogenic risk exceedances associated with exposure to groundwater were due primarily to the presence of pesticides in the floating hydrocarbon product. Exposures to soil did not result in unacceptable risks.

Ecological Risk Assessment

The COCs identified for the ERA include 4,4-DDT, PCBs, TPH, and silver, each of which were detected in surface soil and/or sediment. Estimated chronic ecological hazard quotients (EHQs) exceeded criteria for the short-tailed shrew and broad-winged hawk, while acute EHQs exceeded

criteria for the red fox and broad-winged hawk. The elevated EHQs were primarily attributable to PCBs. An evaluation of potential ecological risks was also conducted in 1996 as part of a facility-wide ERA conducted by the USFWS. The evaluation included the collection of surface soil, sediment and surface water samples, bioassay tests on macrobenthic invertebrate and earthworm samples and the collection of small mammal composite samples. Elevated levels of DDT and PCBs were detected in earthworm and mammal samples in the drainage ditch near Former Impoundment A. In Drainage Ditch 1, PAHs, DDT, chromium, copper, lead, selenium, silver and zinc were detected in earthworm samples at elevated levels and PCBs and lead were detected at elevated levels in mammal samples. High risks were predicted to the American woodcock from DDT and to the American Robin from PCBs, with severe risks predicted to the long-tail shrew, short-tail shrew, and American woodcock from PCBs. In the pond area, the sediment bioassay exhibited acute mortality in each of the macroinvertebrates sampled and tadpole data predicted adverse impacts to higher trophic species. The findings confirmed that contamination of surface soil and sediment at Area 41, if not remediated, poses a risk to ecological receptors.

Remedy Selection

The ROD for Area 41 was signed on September 27, 2000. The RAOs listed in the ROD are as follows:

- Prevent exposure of humans and biota to TPH in Fuel Farm Area surface soils at levels exceeding the NJSCC, a to-be-considered requirement (TBC), of 10,000 ppm total organics;
- Prevent exposure of humans via ground water ingestion to VOCs, pesticides and inorganics at levels exceeding state and federal drinking-water standards and New Jersey GWQS within the Fuel Farm and Former Impoundment A areas. Groundwater remediation levels will be the more stringent of state and federal drinking water standards or New Jersey GWQS;
- Prevent exposure of humans and biota to product contaminants, prevent migration of product contaminants, and prevent subsequent impacts to soil and groundwater quality;
- Prevent potential impacts to groundwater quality resulting from the presence of PCBs in Drainage Ditch 2 soils at levels exceeding the impact to groundwater NJSCC;
- Prevent the exposure of humans to PCBs and PAHs in drainage ditch surface soils at levels exceeding the non-residential direct-contact NJSCC, and prevent releases of these contaminants into surface waters during storm events; and
- Prevent the exposure of biota to DDT, PCBs and inorganics in drainage ditch soils and pond sediments at levels which pose unacceptable environmental risks.

The selected remedy for Area 41 includes the following components:

- Excavation of approximately 450 cubic yards of PCB-contaminated soil and sediment from two drainage ditches and transport off site for disposal at a licensed facility;
- Excavation of approximately 1 cubic yard of TPH-contaminated soil and transport off site for disposal at a licensed facility, provided the soil was not removed during tank-closure activities;
- Backfilling of a man-made depression area and associated drainage ditch with clean soils;

- Extraction of free petroleum product present on the water table in both a former impoundment area and the Fuel Farm area and transport off site for incineration at a licensed facility;
- Extraction of contaminated ground water in the former impoundment and Fuel Farm areas with treatment using carbon adsorption and filtration; treated groundwater will be recharged to the subsurface in the vicinity of the site with possible partial discharge of treated groundwater to the sanitary sewer; and
- Establishment of residential site use restrictions.

Remedial Implementation and Remedial Systems

Construction of the remedy commenced in June 2002. Clearance of unexploded ordnance (UXO) was required before excavation activities could begin. This activity has been completed in current areas of excavation. Post-excavation sampling did not result in detection of explosives. TPH- and PCB-contaminated soil excavation activities have also been completed, with approximately 9,500 tons of contaminated soil removed for off-site disposal. The volume of soil requiring remediation was greater than originally estimated because sampling conducted during the USFWS ERA indicated the extent of PCB-contaminated soils was larger than originally estimated. This was confirmed during pre-remediation sampling.

Pre-excavation sampling activities revealed a large area of PAH-contaminated surface soil. Since this contamination had not been accounted for in the ROD and is not intrinsic to the Site 41 remedy, it will be treated as a separate operable unit (OU7A). Additional construction activities located in the area of PAH exceedances will be delayed until the PAH-contaminated soil remedy is determined.
Construction of the groundwater remediation system is progressing in concert with the construction of the groundwater remediation system at Area B. Extracted groundwater from both sites will be pumped to Area D, where it will be treated along with Area D groundwater in a new treatment system to be constructed there. This portion of the project is being implemented in phases, due to FAA funding limitations.

Because the remedies at Areas 41 and B are being constructed concurrently and share in some remedial components (e.g., a single new treatment system), it is difficult to attribute construction costs individually to the subject sites. The estimated combined construction cost for Areas B and 41 is approximately $9.3 million.

System Operations and Maintenance

Not applicable; the system is under construction.

Data Review

<u>Groundwater Monitoring</u>

The last round of quarterly groundwater monitoring was conducted at Area 41 in April 2000, with the subsequent commencement of soil and groundwater remedial construction activities at

the site. During the period following the last five-year review (i.e., between September 1999 and April 2000), previous monitoring results were confirmed, with no new contaminants detected in the sampled wells and contaminant levels remaining generally comparable to previous sampling results.

Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The PCB-contaminated soil excavation components of the remedy have been completed as described in the ROD for Area 41. TPH-contaminated soil removal has also been completed. Construction of the groundwater remediation system has not been completed.

Access to the site continues to be limited by the FAA's security system to authorized FAA and FAA contractor employees.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

No changes in physical conditions of the site have occurred that would affect the protectiveness of the remedy other than the removal of PCB- and TPH-contaminated soils. Also, no new contaminant sources have been identified. The identification of an extensive area of PAH-contaminated surface soils will be addressed as a separate operable unit.

The cleanup level for the removal of PCB-contaminated soils was based on non-residential NJSCC. Consequently, the site is suitable for future industrial/commercial use (although there are no current plans for the development of the site for future industrial/commercial use). A potable well has not been installed at the site; therefore, no exposures to contaminated groundwater (via ingestion) are occurring and the exposure assumptions in the ROD are still valid. In addition, there is currently no soil vapor exposure pathway.

The groundwater ARARs defined in the Area 41 ROD are based on drinking water standards and New Jersey GWQS. Because of the site's location within the Pinelands Protection Area, the New Jersey GWQS consist of the natural background levels or PQLs. These standards are still current and are equal to or more stringent than drinking water standards (see Table 11).

The soil cleanup standards identified in the Area 41 ROD are based on NJSCC. These levels included 2 ppm for PCBs (based on non-residential exposures), 0.66 ppm for benzo(a)pyrene, and 10,000 ppm for total organic compounds in soils. These NJSCC have not changed since the ROD was signed (See Table 12). Therefore, the soil standards presented in the ROD continue to be protective of human health. Also, no new location-specific or action-specific ARARs have been identified that are not being addressed by the remedy.

Since the soil and groundwater cleanup standards for the remedy are equal to or more stringent than human-health-based promulgated standards and cleanup criteria, the cleanup standards are expected to remain protective of human health. While toxicity values for some of the

contaminants of concern evaluated within the HHRA have changed (see Table 13), these changes are not expected to impact the protectiveness of the remedy, since no site-specific, risk-based cleanup levels were used as the basis for the remedy. The soil remedy (relative to TPH- and PCB-contaminated soils) is complete and remains protective of human health. The groundwater remedy is progressing as expected and also remains protective of human health. PAH-contaminated soils will be addressed as a separate operable unit.

Baseline ecological risks were evaluated based on pre-remedial concentrations of surface soil contaminants. While a specific evaluation of the ecological protectiveness of the soil cleanup standards was not conducted, the potential risks associated with the contaminated soils have been reduced through the implementation of the soil remedial action.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

The HHRA for Area 41 did not include an unrestricted land-use scenario. In addition, the cleanup level for PCBs and PAHs was based on the non-residential NJSCC and groundwater contaminant levels exceed MCLs. Consequently, LUCs are required at Area 41 to restrict residential development and restrict groundwater use. The ROD stipulated that a Declaration of Environmental Restrictions, in accordance with NJAC regulations defined at 7:26E, be established to prevent residential use at the site but this has not yet been established (it must reflect post-remediation soil contamination levels and therefore has been delayed pending completion of the soil remedial action and resolution of OU7A). EPA has requested that FAA develop a facility-wide LUCAP to address areas where the presence of residual contamination and/or the lack of evaluation of an unrestricted (i.e., residential) use scenario in the HHRA requires the establishment and maintenance of site use restrictions. To date, FAA has not responded as to whether they will be developing such a plan.

As previously mentioned, a large additional area of PAH-contaminated soil has been identified at Area 41 which was not accounted for in the ROD. FAA has agreed to treat this new-found area of contaminated soil as a separate operable unit since it does not directly affect the implementation of the Area 41 remedy as stipulated in the ROD.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD. Some delays in the implementation of remedial measures have resulted from FAA funding issues, from the presence of UXO over part of the site, and from the discovery of a large additional area of PAH-contaminated soils that will be addressed within a separate operable unit. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. ARARs cited in the ROD remain protective of human health and, due to the lack of use of site-specific risk-based cleanup levels, changes in toxicity information are not expected to impact the protectiveness of the selected remedy.

Recommendations

It is recommended that FAA complete construction of the Area 41 remedy and implement the remedy as soon as practical. It is also recommended that FAA address OU7A in a timely fashion and develop a facility-wide LUCAP that will include appropriate LUCs for Area 41.

Protectiveness Statement

The remedy for Area 41, Fuel Farm and Photo Lab Area, will protect human health and the environment when it is completed. Currently, there is no unacceptable exposure to human or environmental receptors from source area contaminants and none expected over the next five years.

OU08 - Area B - Navy Fire Test Facility:

History of Contamination and Initial Response

Area B, referred to as the Navy Fire Test Facility, is located near the former sewage treatment plant in the southwestern portion of the FAA property. The SBAC flows from west to east along the southern portion of the area. The area is currently grass-covered, with a wooded area in the southern portion of the site along the stream. An unnamed road traverses the central portion of the site. Area B was used during the late 1950s and early 1960s for aircraft fire training. A review of historical aerial photographs indicates that the highest level of activity occurred between 1957 and 1962. During this time frame, aircraft and sections of aircraft were located throughout the area and portions of the area's ground surface exhibited dark-colored stains. By 1965, the area had been graded over. A portion of the area was later used for General Services Administration (GSA) motor-pool parking.

Basis for Taking Action

The Area B investigation included six phases of investigation conducted between December 1986 and July 1993. No PP compounds were detected in surface water. In addition, no contaminants were detected in surface soil, subsurface soil and sediment above non-residential NJSCC. However, inorganics and VOCs were detected above MCLs/PQLs in groundwater.

Subsequent to the completion of the Phase I investigation of December 1986, the presence of an 8-inch thick, floating hydrocarbon product layer was identified. In late 1988, a sample of the product was collected. It exhibited an odor characteristic of a mixture of gasoline and kerosene and chemical analysis indicated that its chromatogram most closely resembles that of gasoline. Xylene, chlorobenzene, and ethylbenzene were identified as the main components in the PP analysis of the product sample. Ethylbenzene was the only VOC detected in a groundwater sample collected from beneath the product layer. In June 1989, a product thickness of only 0.5 inches was measured. In November 1989, no measurable thickness of product could be identified. Due to the relatively thin layer of product measured in the well and the documented tendency for floating product to accumulate in wells to greater thicknesses than actually present in the surrounding aquifer, seasonal variations in water level could account for the product's

periodic absence during this period. In August 1992, additional investigations were conducted to determine if the stained soils or aircraft areas visible in the historic aerial photographs could be a potential source of contamination at Area B. No consistent pattern of contamination was noted and no potential source of the floating product was identified. Approximately 3 inches of floating product were measured during this investigation. During January 1993, a product thickness of approximately 2 inches was measured.

Contaminants

COCs, as identified in the HHRA for Area B, in each medium include:

Soil	Groundwater
Arsenic	Arsenic
Cadmium	Chromium
Chromium	Copper
Copper	Lead
Lead	Mercury
Mercury	Zinc
Zinc	Acetone
Toluene	Bromochloromethane
bis(2-Ethylhexyl)phthalate	Chloroform
Butylbenzylphthalate	1,1-Dichloroethane
Di-n-butylphthalate	1,1-Dichloroethene
Di-n-octylphthalate	1,2-(cis)Dichloroethene
Naphthalene	1,2-Dichloropropane
1,2,4-Trichlorobenzene	Ethylbenzene
4,4-DDE	Methylene Chloride
4,4-DDT	Tetrachloroethene
Aroclor 1242 (PCB)	Toluene
	1,1,1-Trichloroethane
	Trichloroethene
	Xylene (total)
	2-Methylnaphthalene
	4-Methylphenol
	Naphthalene
	Phenol
	4,4-DDE
	4,4-DDT
	Heptachlor epoxide

Human Health Risk Assessment

Potential risks associated with exposures to soil and groundwater at Area B were estimated assuming future development of the site where workers would be at the site on a daily basis and a potable well would be installed at the site. Under these scenarios, exposures to soil and

groundwater were based on an exposure frequency of 250 days/year. As modeled, exposures to soil and groundwater at the site did not result in unacceptable risks. Exposure to Area B groundwater resulted in a risk level within EPA's carcinogenic risk range and below the noncarcinogenic risk criteria. Arsenic and methylene chloride were the primary contributors to carcinogenic risk. Exposure to soil resulted in risk levels below EPA's risk-management criteria.

Ecological Risk Assessment

The COCs identified for the ERA include trichlorobenzene, di-n-butylphthalate, 4,4-DDT, 4,4-DDE, arsenic, cadmium, chromium, copper, lead and zinc, all constituents which were detected in surface soil and/or sediment at Area B. The results of the ERA indicate that Area B poses a generally low order of risk for terrestrial receptors, with estimated risks below levels of concern for deer, fox, and hawk, and slightly elevated risks for the mouse and woodcock. Cadmium and chromium contributed most to the estimated risks for mouse and woodcock. Potential risks associated with exposures to the sediments of the nearby South Branch of Absecon Creek will be addressed in the Area U operable unit, which is currently in the RI stage.

Remedy Selection

The ROD for Area B was signed on September 20, 1996. The RAOs listed in the ROD are as follows:

- Prevent exposure, due to groundwater ingestion, to groundwater contaminants which are present at levels exceeding state and federal drinking water standards and New Jersey GWQS. Groundwater remediation levels will be the more stringent of state and federal drinking water standards and New Jersey GWQS;
- Prevent migration and discharge of groundwater contaminants to the SBAC and restore groundwater quality; and
- Prevent exposure to and migration of free-product contaminants from the vicinity of well B-MW3S.

Based on subsequent investigation activities at Area B, the extent of the VOC plume was found to be more extensive than initial investigations had indicated. As a result, the cost of implementing the preferred remedy, consisting of air sparging and soil-vapor extraction, became prohibitive. Additionally, inorganic compounds, including mercury, were found to be present in groundwater at Area B. Air sparging and soil vapor extraction's inability to address metal contamination, along with cost concerns, led FAA to select the contingency remedy documented in the ROD. The contingency remedy for Area B includes the following components:

- Installation of additional monitoring wells;
- Continued groundwater and surface water monitoring;
- Installation and operation of product/groundwater extraction wells;
- Physical separation of product and off-site transport for incineration;
- On-site groundwater treatment by air stripping; and
- Discharge of treated water back into the shallow groundwater.

Remedial Implementation and Remedial Systems

Construction of the groundwater remediation system is progressing in concert with groundwater remediation at Area 41. Extracted groundwater from both sites will be pumped to Area D, where it will be treated along with Area D groundwater in a new treatment system to be constructed there. This project is being implemented in phases, due to FAA funding limitations.

Because the remedies at Areas 41 and B are being constructed concurrently and share in some remedial components (e.g., a single new treatment system), it is difficult to attribute construction costs individually to the subject sites. The estimated combined construction cost for Areas B and 41 is approximately $9.3 million. The annual cost of groundwater monitoring at Area B is estimated at approximately $60,000.

System Operations and Maintenance

Not applicable; remedial construction is on-going.

Data Review

Groundwater Monitoring

Pre-design studies of groundwater quality were conducted in several phases between July 1999 and July 2000 to gain additional information on the vertical extent of contamination and to further define groundwater quality on the south side of the SBAC. These studies delineated extensive TCE and PCE plumes in the shallow aquifer and identified the presence of TCE at depth on both sides of the SBAC stream channel.

Groundwater and surface water monitoring also is conducted on a quarterly basis at Area B. The quarterly monitoring conducted subsequent to the last five-year review has generally confirmed previous monitoring results, although some changes in water quality have been observed. At well B-MW5S, the levels of 1,1-dichloroethane, 1,1-DCE, PCE, and chloroform detected since the last 5-year review have exceeded previously detected levels. New groundwater contaminants not previously detected include bromomethane, chloromethane, and chloroethane at B-MW5S, bromomethane at B-MW6S, and acetone at B-MW7S.

The product thickness in monitoring well B-MW3S has continued to vary, with no product layer detected from October 1999 to August 2002. A thin layer of product was subsequently detected in November 2002 and February 2003.

Prior to the April 1999 sampling round, no analytically valid VOCs had been detected in surface water samples from the South Branch that could be attributable to Area B. Since then, low levels of PCE have been detected in surface water samples collected downstream of and/or adjacent to Area B in November 2001, August 2002, May 2003 and August 2003. Chloroform has also periodically been detected in surface water samples. All detections of PCE and chloroform have been below their respective New Jersey Surface Water Quality Criteria (NJAC 7:9B) as well as current national water quality criteria.

As part of ground water monitoring at Area B, the downgradient monitoring wells are also sampled on a bi-annual basis. In February 2004, very low levels of VOCs (below drinking water standards but at the PQLs) were detected in downgradient wells. The wells were resampled in March 2004 and the previous results were confirmed.

Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

Not applicable; remedial construction is ongoing.

Access to the site continues to be limited by the FAA's security system to authorized FAA and FAA contractor employees.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

No changes in physical conditions of the site have occurred that would affect the protectiveness of the remedy. Additional chlorinated organic contamination of the groundwater has been identified since the last five-year review. However, the implementation of the contingency remedy specified within the ROD will support the remediation of this contamination.

The cleanup levels used to evaluate soil contamination within the EI/FS were based on non-residential NJSCC. Consequently, the site is suitable for future industrial/commercial use (although there are no current plans for the development of the site for future industrial/commercial use). A potable well has not been installed at the site; therefore, no exposures to contaminated groundwater (via ingestion) are occurring and the exposure assumptions in the ROD are still valid. In addition, there is currently no soil exposure pathway.

The groundwater ARARs defined in the Area B ROD are based on the more stringent of drinking water standards and New Jersey GWQS, including background levels as they were defined at the time of ROD signature. These standards are still current (see Table 14), with New Jersey GWQS the most stringent of the specified ARARs.

As no soils exhibited contaminant levels exceeding NJSCC and no unacceptable risks were associated with the modeled exposures to soils at the site, no ARARs were defined for Area B soils. There is no additional data to suggest that the soils at the site do not continue to be protective of human health. Also, no new location-specific or action-specific ARARs have been identified that are not being addressed by the remedy.

Since the groundwater cleanup standards for the remedy are equal to or more stringent than human-health-based promulgated standards and cleanup criteria, the cleanup standards are expected to remain protective of human health. While toxicity values for some of the contaminants of concern evaluated within the human health risk assessment have changed (see Table 15), these changes are not expected to impact the protectiveness of the remedy, since no

site-specific, risk-based cleanup levels were used as the basis for the remedy. The construction of the remedy is progressing as expected and also remains protective of human health.

Baseline ecological risks were evaluated based on existing surface soil and sediment contaminant levels. A low order of risk was identified for terrestrial receptors. There is no new information to suggest that the soils do not continue to be protective of ecological receptors. Potential risks to aquatic receptors will be further evaluated and addressed, as appropriate, as part of the Area U ERA. The Pinelands Commission, as part of their approval of the remedial action at Area B, has required monitoring of the adjacent wetlands (both baseline and during operation of the remedial system) to allow for the assessment of any potential impacts on the wetland community. A final report will be prepared upon completion of the monitoring effort.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Groundwater contamination at Area B is present at levels exceeding MCLs. The HHRA for Area B was based on a restricted land use scenario; the potential risks associated with residential land use scenario were not evaluated. However, there are no LUCs in effect at Area B to restrict land use. EPA has requested that FAA develop a facility-wide LUCAP to address areas such as Area B where the presence of residual contamination and/or the lack of evaluation of an unrestricted (i.e. residential) use scenario in the HHRA requires the establishment and maintenance of site use restrictions. However, FAA has not responded as to whether they will be developing such a plan.

Pre-design groundwater monitoring identified the presence of a more extensive chlorinated volatile organics plume than was known at the time the ROD was signed. Since the plume was identified as part of pre-design activities, however, the groundwater remedial system is being designed to address this additional area of contamination. Due to funding limitations, the design and construction of the groundwater remedial system has been conducted in phases. Recent downgradient groundwater monitoring may indicate that the chlorinated volatile organics plume is migrating faster than anticipated.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy will function as intended by the ROD, once construction is complete. Some delays in the implementation of the remedial measures have resulted from FAA funding issues. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. ARARs cited in the ROD remain protective of human health and, due to the lack of use of site-specific risk-based cleanup levels, changes in toxicity information are not expected to impact the protectiveness of the selected remedy. Recent changes in downgradient groundwater quality may indicate continued migration of the contaminated groundwater plume. This condition requires further monitoring to ensure that the remedial system, when operational, captures the entire contaminated groundwater plume.

Recommendations

It is recommended that FAA complete construction of the Area B remedy and implement the remedy as soon as practical, and that monitoring of downgradient water quality continue. It is also recommended that FAA develop a facility-wide LUCAP that will include appropriate LUCs for Area B.

Protectiveness Statement

The remedy for Area B, Navy Fire Test Facility, is protective of the environment and will protect human health when it is completed. Currently, there is no unacceptable exposure to human or environmental receptors from source area contaminants and none expected over the next five years.

OU09 - Areas A, J, and N - Navy R&D Landfill, Excavation Area Near Runway, and Catapult Test Area Near Bldg. 214:

Area A, Navy R&D Landfill

History of Contamination and Initial Response

Area A is located south of the Upper Atlantic City Reservoir, in the R&D portion of the FAA Technical Center. While Area A is referred to as the R&D Navy Landfill, it consists of two separate investigation areas: the former R&D Navy landfill area, and a former borrow pit area. The R&D Navy landfill area, located north of Card Road, was originally developed prior to 1940 and was used as a dumping area during the 1940s and 1950s. The former borrow pit area, located south of Card Road, was historically the site of a Civil Aviation Security firing range and is currently used for Federal Air Marshal training facilities. Northeastern portions of the former borrow pit area were used for the disposal of construction debris. A groundwater production well (FAA-224) is located immediately west of Area A. It provides nonpotable water to Building 224, located along Card Road just west of the former borrow pit area. Building 224 is a relatively small structure used for the storage of electronic equipment.

Basis for No Action with Continued Monitoring

Results of surface and subsurface soil sampling at Area A did not indicate any contaminant levels greater than the non-residential NJSCC. However, inorganics and VOCs were detected above MCLs/PQLs in groundwater.

Contaminants

COCs, as defined in the HHRA for Area A, in each medium include:

Soil	Groundwater
n-Nitrosodiphenylamine	bis(2-Ethylhexyl)phthalate
Cadmium	Cadmium
Chromium	Chromium
Lead	Lead
Aroclor 1242 (PCB)	Mercury
Phenol	

Since Area A was not expected to be used for any scheduled activity, the exposure frequencies used in the HHRA were restrictive. For example, exposure to surface soil was based on a maximum exposure frequency of 24 days/year. Exposure to groundwater was based on a commercial/industrial maximum exposure frequency of 250 days/year, assuming a potable well was installed at the site. Exposure to Area A groundwater resulted in an estimated risk level within EPA's carcinogenic-risk range, primarily due to the detection of bis(2-ethylhexyl)phthalate, which was thought to be a laboratory contaminant. Inorganics were also detected in groundwater above MCLs or PQLs but they either were not confirmed at those levels in subsequent sampling events or are consistent with regional background levels. Non-carcinogenic risk hazards due to exposure to groundwater were below EPA criteria. Exposure to soil resulted in estimated risk levels within EPA's carcinogenic-risk range and below the non-carcinogenic criteria. The carcinogenic risk was attributable to a PCB detection in subsurface soil which could not be duplicated in subsequent sampling.

Area J, Excavation Area Near Runway

History of Contamination and Initial Response

Area J is located between the Atlantic City International Airport Terminal and Runway 26. Currently the area consists of a grass-covered field. Area J, referred to as the Excavation Area near the Runway, appears on a 1962 aerial photograph of the FAA property as a large excavation, approximately 800 feet by 500 feet in area, with the characteristic appearance of a borrow pit or disposal area. The FAA believes the area was a rip-rap stockpile related to the construction of the Atlantic City Air Terminal Ramp. Subsequent aerial photos indicate that by 1974 the area had been graded and seeded.

Basis for No Action

Groundwater sampling at Area J identified minor exceedances of PQLs which could not be confirmed when the wells were resampled or which were also present in the background well. Area J is suitable for unrestricted use and will not be further discussed in this five year review.

Area N, Catapult Test Area Near Building 214

History of Contamination and Initial Response

Area N, referred to as the Building 214 Catapult Test Area, is located adjacent to Building 214 in the R&D portion of the FAA Technical Center, south of the Upper Atlantic City Reservoir. Area N was used for gelled-fuel tests over a four-year period beginning around 1960. A 120-gallon fuel tank was propelled down a catapult into a ramp and past an ignition source, resulting in a large explosion and fireball. Unburned fuel from the tests was deposited on an earthen berm that extended around the end of the catapult. The tests were followed by vehicle-crash tests that also could have spilled fuels and oils onto the berm area. After the termination of the fuel tests, additional fill was placed over the surface of the berm.

Basis for No Action

Results of surface and subsurface soil sampling at Area N did not indicate any contaminant levels greater than the residential NJSCC and consequently no risk assessment was done. Similarly, groundwater samples indicated minor exceedances of MCLs/PQLs but these results could not be verified during subsequent sampling and did not warrant a risk assessment. Consequently, the site is suitable for unrestricted use and will not be discussed further in this five-year review.

Remedy Selection

The ROD for Areas A, J and N was signed on July 22, 1997. The selected remedy for Areas A, J and N is no further action with ground water monitoring at Area A.

Remedial Implementation and Remedial Systems

Implementation activities are strictly limited to the quarterly groundwater sampling conducted at Area A. The annual cost of sampling at Area A is approximately $15,000 per year.

System Operations and Maintenance

Not applicable; no active remedy.

Data Review

Groundwater Monitoring

The presence of low levels of chloroform at two monitoring wells has been confirmed at Area A throughout the quarterly groundwater sampling program. Since the last five-year review, the groundwater monitoring results have remained consistent with the previous results, with chloroform the only constituent present at levels exceeding PQLs. Other constituents detected in the groundwater since the last five-year review include chloromethane, bromomethane, and

chlorobenzene, but these were detected during a single sampling round (February 2002) at levels below PQLs.

Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

Quarterly groundwater monitoring has been taking place at Area A and has been effective in monitoring long-term groundwater quality trends. Areas J and N are "no further action" areas.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The land use at Area A has changed since the last five-year review. Construction of a Federal Air Marshal training center was completed in 2003 on part of the borrow pit portion of Area A. Because the original HHRA exposure assumptions did not reflect the proposed land use, the EPA requested that FAA update the original HHRA to reflect a more extensive exposure to surface soils at the site under a commercial/industrial use scenario. FAA recalculated the estimated risks associated with the surface soil COCs at Area A using the standard commercial/industrial exposure frequency of 250 days per year. The revised risk assessment did not predict excessive risk levels.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

The revised risk assessment for Area A surface soil was based on a restricted land use (commercial/industrial); potential risks associated with residential use of the site have not been evaluated. In addition, groundwater monitoring at Area A has indicated elevated levels of chloroform. EPA has requested that FAA develop a facility-wide LUCAP to address areas such as Area A where the presence of residual contamination and/or the lack of evaluation of an unrestricted (i.e., residential) use scenario in the HHRA requires the establishment and maintenance of site use restrictions. However, FAA has not responded as to whether they will be developing such a plan.

Technical Assessment Summary

According to the data reviewed, the site inspection and the interviews, the existing conditions at Area A remain protective of human health. Changes in site use since the last five-year review have been evaluated to ensure that the site does not pose any unacceptable risks. There is no other information that calls into question the protectiveness of the remedy. Areas J and N are suitable for unrestricted use and therefore are not addressed within the technical assessment.

Recommendations

It is recommended that FAA develop a facility-wide LUCAP that will include appropriate LUCs for Area A. Based on the groundwater data that has been collected at Area A since 1987,

including quarterly groundwater monitoring data for the past 10 years, groundwater quality at Area has remained fairly constant. Chloroform is the only constituent that has been detected at levels exceeding PQLs, but it is also present in the groundwater at other FAA sites (e.g., nearby Area 20A) and may not be related to site activities. Therefore, with the institution of land use controls at Area A to prevent future exposures to groundwater at the site, the FAA could pursue the potential discontinuation of future monitoring activities at Area A.

Protectiveness Statement

The remedy of "no further action" with groundwater monitoring at Area A remains protective of Areas A, J, and N.

OU10 – Area P – Building 204 Fuel Spill:

A ROD was signed on February 13, 1997 to document the decision of no further action. A non-time-critical removal action was conducted at Area P in 1987 after construction contractors encountered fuel in an excavation. The fuel was determined to be associated with a leak in a valve pit adjacent to Building 204. Approximately 278 cubic yards of petroleum-contaminated soil were excavated from the spill area and transported for off-site disposal and approximately 5,000 gallons of impacted water generated as a result of dewatering of the excavation area were also removed off-site for treatment. Confirmatory sampling of soil, groundwater and surface water that took place in 1992 and 1994 did not reveal any suspected contaminants above detection levels. Consequently, the site is suitable for unrestricted use and LUCs are not required. Therefore, Area P, Building 204 Fuel Spill, will not be further considered in this five-year review.

OU11 - Areas 27, 56, F, R, and S - Fuel Mist Test Area, Abandoned Navy Landfill, Air Blast Facility, Trash Dump, and Excavation Area West of Tilton Road:

Area 27, Fuel Mist Test Area

History of Contamination and Initial Response

Area 27 is located south of the Upper Atlantic City Reservoir, in the R&D portion of the FAA Technical Center. Area 27 includes an area located adjacent to Building 211, as well as downgradient portions of a storm drain and drainage swale which received runoff from the Building 211 area. The total site area is approximately 4 acres. At Area 27, a fuel mist test facility was used for the testing of anti-misting additives for jet fuel until the practice was discontinued in 1986. The test procedure involved spraying the jet fuel and burning it in the open. Fuel mist tests were first conducted in 1979 over an unlined open area. Approximately 25 tests were run before the January 1980 installation of a Mylar liner for the collection of unburned fuel. In September 1985, a second Mylar liner was installed above the original.

In 1986, approximately 100 gallons of jet fuel were apparently spilled into a storm drainage piping system at Area 27 due to the malfunction of an oil/water separator at Building 211. This

drainage system leads to a small, unlined drainage swale north of Area 27. At the time of the 1986 spill, jet fuel passed through the drainage system and contaminated soil in the swale. The contaminated soil was removed from the swale areas in the spring of 1986 and disposed of off site. An additional removal action took place in 1989 in which contaminated soils were removed from a catch basin and associated piping was flushed out. Also, based on a soil gas survey, three hot spots were excavated from the swale.

Basis for Taking Action

Results of post-removal-action soil sampling at Area 27 did not identify the presence of any contaminants at levels exceeding the residential NJSCC. In groundwater, chloroform and PCBs were the only organics detected at levels exceeding MCLs and/or PQLs. However, each constituent was detected in only one groundwater sample and the presence of PCBs in the groundwater was not verified when the well was resampled. Beryllium, chromium, mercury, lead and zinc were the only inorganics detected at levels exceeding MCLs/PQLs. However, the presence of chromium, lead and zinc in the background water and the infrequency of detection of the other inorganics in site wells indicated that past activities at Area 27 have not impacted groundwater quality.

Contaminants

COCs, as defined in the HHRA for Area 27, in each medium include:

Soil	Groundwater
4,4-DDT	Aroclor 1242 (PCB)

Human Health Risk Assessment

Since Area 27 was not expected to be used for any scheduled activity, the exposure frequencies used in the risk assessment were restrictive. For example, exposure to surface soil was based on a maximum exposure frequency of 20 days/year. Exposure to groundwater was based on a commercial/industrial maximum exposure frequency of 250 days/year, assuming a potable well was installed at the site. Exposure to Area 27 groundwater is associated with an estimated risk level within EPA's carcinogenic risk range due to the maximum detected concentration of PCBs. However, detection of PCBs in groundwater could not be replicated in subsequent sampling efforts and carcinogenic risk based on an average PCB level fell below EPA's risk range. Potential noncarcinogenic risks due to the ingestion of groundwater were below EPA criteria. Exposure to soil is associated with estimated risk levels below EPA's risk management criteria.

Ecological Risk Assessment

A qualitative ERA was conducted on the basis of the same soil COC as the HHRA. Small mammals and earthworms could be exposed to 4,4-DDT via soil contact. However, given the detection of 4,4-DDT in only one surface soil sample and the relatively low level detected, major toxic effects associated with the presence of 4,4-DDT in Area 27 surface soils are unlikely.

Based upon the results of bioassays conducted within the Area 27 drainage swale, the USFWS facility-wide ERA also concluded that Area 27 is not presenting unacceptable risks to ecological receptors.

Area 56, Abandoned Navy Landfill

History of Contamination and Initial Response

Area 56, the Abandoned Navy Landfill, is located near the current FAA hangar, south of the major east-west runway. The 11-acre area is currently characterized by the presence of a softball field and a parking area over portions of the former disposal area. The landfill was operated by the Navy between 1943 and 1958. The nature and total volume of material disposed of at the site are unknown.

Basis for Taking Action

Results of soil sampling at Area 56 did not identify the presence of any contaminants at levels exceeding the residential NJSCC. In groundwater, TCA and, to a lesser extent, 1,1-DCE were detected in an intermediate aquifer monitoring well at levels exceeding MCLs/PQLs. Inorganics were detected in a shallow monitoring well at levels exceeding MCLs/PQLs, although concentrations appeared to be decreasing with time.

Contaminants

COCs, as defined in the HHRA for Area 56, in each medium are as follows:

Soil	Groundwater
bis(2-Ethylhexyl)phthalate	bis(2-Ethylhexyl)phthalate
Chromium	Chromium
Lead	Lead
	Cadmium
	Mercury

Human Health Risk Assessment

Since Area 56 was not expected to be used for any scheduled activity, the exposure frequencies used in the risk assessment were restrictive. For example, exposure to surface soil was based on a maximum exposure frequency of 20 days/year. Exposure to groundwater was based on a commercial/industrial maximum exposure frequency of 250 days/year, assuming a potable well was installed at the site. The estimated risks associated with exposures to Area 56 groundwater and soil were below EPA's risk management criteria.

Ecological Risk Assessment

A qualitative ERA was conducted on the basis of the same COCs as the HHRA. Potential risks to wildlife associated with the presence of chromium and lead in surface soils would not be considered to be significant, as the detected levels of these constituents were not elevated above state background levels. Therefore, it is unlikely that Area 56 would be associated with adverse impacts to ecological receptors. Based un a review of available contaminant data and site inspection, the USFWS also concluded that no exposure concern exists for terrestrial receptors at Area 56.

Area F, Air Blast Facility

History of Contamination and Initial Response

Area F is located north of the major east-west runway, in the airport operations area of the FAA Technical Center. The Building 311 complex, consisting of buildings and trailers, is located at Area F, as are the air blast test facilities, including a large concrete pad used in testing activities. The entire site comprises approximately 4 acres. The air blast facility at Area F included a large exhaust duct which was used to route air at high velocity to a jet fuselage located on a concrete pad. During historic site use, ethylene glycol and jet fuel may have spilled onto the concrete pad during testing activities. Three JP-4 jet-fuel underground storage tanks were historically located in the southwestern portion of Area F and were removed prior to the initiation of site investigations. Three replacement underground storage tanks were installed within 50 feet and south of the original tank locations. While these replacement tanks were present at the time the site investigations were conducted, they have since been removed. An unexplained apparent loss of 11,000 gallons of jet fuel from the fuel storage area (based on written fuel-storage records) prompted the performance of site investigations to determine if a subsurface leak was a potential explanation for the discrepancy.

Basis for Taking Action

Soil sampling at Area F did not identify the presence of any contaminants at levels exceeding the residential NJSCC. In groundwater, benzene was detected in one well at a level exceeding the PQL, but its presence was not verified in subsequent resampling of the well. Inorganics were detected at levels exceeding MCLs/PQLs but were not consistently present at elevated levels.

Contaminants

COCs, as defined in the HHRA for Area F, in each medium include:

Soil	Groundwater
Cadmium	Cadmium
Chromium	Chromium
Acetone	Copper
Ethylbenzene	Lead

Soil	Groundwater
2-Hexanone	Mercury
4-Methyl-2-pentanone	Selenium
Methylene chloride	Zinc
Xylene	Acetone
bis(2-Ethylhexyl)phthalate	Benzene
Naphthalene	Ethylbenzene
Phenol	Xylene
PCB (Aroclor 1242)	Phenol

Human Health Risk Assessment

Risks due to exposure to surface soil and groundwater at Area F were based on a standard commercial/industrial exposure frequency of 250 days/year. Exposures to groundwater were evaluated based on the assumed installation of a potable well at the site. The estimated risks associated with exposures to Area F groundwater and soil resulted in risk levels below EPA's risk-management criteria.

Ecological Risk Assessment

A quantitative ERA was conducted on the basis of the following soil COCs: acetone, phenol, cadmium, chromium, lead and zinc. The ERA for Area F indicated EHQ exceedances for all five indicator species evaluated and indicated that a potential for adverse ecological effects exists. The EHQs for the mouse and deer are primarily attributable to cadmium, while the EHQ for the fox is primarily due to cadmium and zinc. Zinc is also the primary contributor to the EHQs for the robin and hawk. Key uncertainties in risk characterization, as reported in the ROD, are that the subject inorganic contaminants are below maximum state background levels reported by NJDEP and the incorporation of uncertainty factors ranging from 8 to 800 into the species-specific benchmark doses for the subject contaminants. The USFWS conducted a site inspection which indicated the presence of poor foraging habitat at Area F. Based on this evaluation, the USFWS concluded that the site does not pose much, if any, threat of exposure to fish and wildlife.

Area R, Trash Dump

History of Contamination and Initial Response

Area R is a former trash dump located west of Tilton Road. Approximately 7 acres in size, Area R currently consists of a cleared area surrounded by low trees. A portion of the eastern part of the area which did not undergo significant filling is considerably lower than the rest of the area and occasionally contains ponded water. The higher elevations in the western part of the area are covered with broken concrete and asphalt fragments. The area is accessed by a dirt road off of English Creek Road. The former trash dump area at Area R was reportedly used as a borrow pit until about 1958, when the Area 56 landfill was closed. At that time, Area R began to be used as a landfill for wood, brush, paper, and construction debris. In 1978 or 1979, a fire at the area

prompted FAA to close the dump and use off-site landfills for trash disposal. The basic stratigraphy of Area R consists of fine to coarse sands overlain by fill. Where fill material was encountered, it consisted of concrete, sand, asphalt, wood, metal and plastic and ranged in thickness from 2 to 12 feet, with the thickest portion in the western part of the site. The water table was encountered at depths of 19 to 22 feet, with the ground water flow direction to the southeast.

Basis for Taking Action

PAHs were identified in Area R soils at levels exceeding residential NJSCC. The detection of PAHs was thought to be attributable to the presence of asphalt fragments over the surface of the site, however. Beryllium was detected in a single subsurface soil sample (20 to 22 feet deep) at a level exceeding the residential NJSCC, but its depth minimizes potential concerns associated with direct exposure. Chloroform and chlorobenzene were consistently detected at levels exceeding PQLs in shallow groundwater at the site. Zinc was also present above the PQL but at levels less than the average zinc level in upgradient wells at the FAA Technical Center.

Contaminants

COCs, as defined in the HHRA for Area R, in each medium include:

Soil	Groundwater
Arsenic	Chromium
Beryllium	Copper
Chromium	Lead
Copper	Nickel
Cyanide	Zinc
Lead	Acetone
Mercury	Benzene
Nickel	2-Butanone
Silver	Chlorobenzene
Zinc	Chloroform
Acenaphthene	1,2-Dichlorobenzene
Anthracene	1,3-Dichlorobenzene
Benzo(a)anthracene	1,4-Dichlorobenzene
Benzo(b)fluoranthene	cis 1,2-Dichloroethene
Benzo(a)pyrene	Ethylbenzene
Benzo(g,h,i)perylene	Vinyl chloride
Benzo(k)fluoranthene	Xylene (total)
Chrysene	Acenaphthene
Dibenzo(a,h)anthracene	bis(2-Ethylhexyl)phthalate
Fluoranthene	Naphthalene
Fluorene	4,4-DDD
Indeno(1,2,3-c,d)pyrene	4,4-DDT
Naphthalene	

Soil

Phenanthrene
Phenol
Pyrene
4,4-DDE
4,4-DDT
Aroclor 1242
Aroclor 1254

Human Health Risk Assessment

Risks due to exposures to surface soil and groundwater at Area R were estimated based on a standard commercial/industrial maximum exposure frequency of 250 days/year. Exposures to groundwater were evaluated based on the assumed installation of a potable well at the site. The estimated risks associated with exposures to Area R groundwater and surface soil were near the upper end of EPA's carcinogenic risk range and below the noncarcinogenic criteria. It should be noted that the detection of PAHs in surface soil samples, which contributed the majority of the carcinogenic risk at Area R, may be attributable to asphalt fragments located over the surface of the site. In addition, vinyl chloride, which contributed the majority of carcinogenic risk due to exposures to groundwater, was detected infrequently.

Ecological Risk Assessment

A quantitative ERA was conducted on the basis of the same COCs as the HHRA. The estimated EHQs exceed criteria for three indicator species, the deer mouse, grasshopper sparrow and broad-winged hawk, indicating a potential for adverse ecological effects. The EHQ for the mouse is primarily attributable to copper, lead and zinc, the EHQ for the sparrow is primarily due to copper and zinc, and the EHQ for the broad-winged hawk is primarily due to zinc. The USFWS conducted a qualitative review of available Area R contaminant data and site inspections and concluded that the site does not pose much, if any, threat of exposure to fish and wildlife.

Area S, Excavated Area West of Tilton Road

History of Contamination and Initial Response

Area S is located west of Tilton Road and approximately 1,300 feet south of Area R. The 11-acre area is currently overgrown with trees, with edges of former excavation areas and small piles of soil material and debris evident. Areas of 1 to 4 feet of standing water are also present. The SBAC is approximately 200 feet to the southwest of the site. The historic use of Area S is unknown. The site was identified in an EPA historic aerial photograph review as an area of "possible liquid impoundments and solid waste disposal." Aerial photographs taken over a period spanning from 1947 to the present indicate the presence of dark-toned material at the surface beginning in 1957. Subsequent photos show excavation areas, areas of standing liquid,

and the presence of trenches and mounds of material at the site. One observed trench appears to drain toward the SBAC.

Basis for Taking Action

Results of soil sampling at Area S did not identify the presence of any contaminants at levels exceeding the residential NJSCC. In groundwater, lead and bis(2-ethylhexyl)phthalate were the only constituents detected at levels exceeding MCLs/PQLs. However, due to their infrequent detections, presence in an upgradient well or presence in a laboratory method blank, it was thought to be unlikely that they were site-related.

Contaminants

COCs, as defined in the HHRA for Area S, in groundwater include:

Lead
Chloroform
bis(2-Ethylhexyl)phthalate
Butylbenzylphthalate
Phenol
Pyrene

Human Health Risk Assessment

Based on a qualitative risk assessment, it was determined that contaminants in soil and groundwater at Area S do not pose unacceptable risks based on a commercial/industrial land use scenario. This was based on the fact that, of the two constituents detected at levels exceeding groundwater criteria, lead was detected at higher levels upgradient of the area and bis(2-ethylhexyl)phthalate, a common laboratory contaminant, was detected in a method blank.

Ecological Risk Assessment

The potential for adverse impacts at Area S was evaluated by comparing the estimated surface soil exposure point concentrations (EPCs) to the surface soil criteria used by the USFWS in conducting their facility-wide ERA. The comparison indicated that all of the surface soil EPCs are at least an order of magnitude less than the selected criteria concentrations. Potential risks associated with the nearby SBAC will be addressed in the Area U operable unit, which is currently in the RI stage.

Remedy Selection

The ROD for Areas 27, 56, F, R and S was signed on September 28, 1999. The remedies for Areas 27, 56, F, R and S are as follows:

- Area 27 - Residential Site Use Restrictions;
- Area 56 - Residential Site Use Restrictions, Continued Groundwater Monitoring and Establishment of a Groundwater Classification Exception Area (CEA);

- Area F - Residential Site Use Restrictions;
- Area R - Residential Site Use Restrictions, Groundwater Use Restrictions Including the Establishment of a CEA and Continued Groundwater Monitoring; and
- Area S - Residential Site Use Restrictions.

While no soil contaminants were detected at levels exceeding the residential NJSCC at Areas 27, 56, F, and S, residential site use restrictions were included in the remedy due to the fact that the HHRA did not evaluate risks associated with residential use of these sites.

Remedial Implementation and Remedial Systems

Land use at Areas 27, 56, F, R, and S remains non-residential. Groundwater monitoring at Areas 56 and R continues on a quarterly basis and exposure to groundwater in those areas is not occurring. The annual cost of groundwater monitoring is estimated to be approximately $15,000 for Area 56 and approximately $45,000 for Area R.

System Operations and Maintenance

Not applicable; no active remedy.

Data Review

Groundwater Monitoring

Area R

During the period following the last five-year review, groundwater quality at Area R has remained fairly constant, with the exception of groundwater quality at monitoring well R-MW5S, which is located on the downgradient edge of Area R. For four consecutive monitoring rounds (February, May, August, and November 2002), chlorobenzene was detected in this well at levels exceeding PQLs. 1,2-Dichlorobenzene and 1,4-dichlorobenzene were also detected in this well at levels exceeding PQLs during this period. Historically, chlorobenzene was detected in this well at levels exceeding PQLs in January 2000 and February 1996. Three more recent sampling rounds conducted between November 2002 and August 2003 have failed to detect chlorobenzene in well R-MW5S, which may indicate that the contaminant detections are sensitive to variations in rainfall (a prolonged drought occurred in southern New Jersey during 2001 extending through most of 2002). FAA has indicated that it will continue to monitor well R-MW5S closely during future quarterly sampling.

Area 56

In the two wells monitored at Area 56, groundwater quality has remained fairly constant or has improved slightly since the last five-year review. At well 56-MW4S, occasional exceedances of metals PQLs have been detected. Elevated metals concentrations detected in November 2002 were attributed to elevated sample turbidity. Chlorinated VOC levels have steadily decreased in well 56-MW4D, continuing a downward trend that began in 1995. No PQL exceedances have

been detected in well 56-MW4D since August 2002. Chloroform, which was not previously detected in this well, has been consistently detected at levels below the PQL since May 2002.

Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

Quarterly groundwater monitoring is continuing at Areas R and 56 and has been effective in evaluating long-term groundwater quality trends. Areas 27, F and S are "no further action" areas.

Question B: *Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?*

Exposure assumptions are still valid as land use has not changed and exposure to groundwater at Areas R and 56 is not occurring. Land use at Area F has also remained the same, so previous USFWS conclusions that Area F does not pose much ecological risk due to poor foraging habitat are still applicable.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

The remedy for Areas 27, 56, F, R, and S calls for residential site use restrictions at each of the sites, with groundwater use restrictions and monitoring for Areas 56 and R, although such controls have not yet been implemented. EPA has requested that FAA develop a facility-wide LUCAP which would document the LUCs necessary for these sites.

Technical Assessment Summary

According to the data reviewed and the interviews conducted, the existing conditions at Areas 56 and R remain protective of human health. No changes in site use have been implemented since the last five-year review that would pose any unacceptable risks. Groundwater monitoring at Areas 56 and R has been carried out on a quarterly basis, as stipulated in the ROD. This additional data indicates a potential change in downgradient groundwater quality at Area R that will require further monitoring.

Recommendations

It is recommended that the groundwater monitoring program be continued at Areas 56 and R and that FAA develop a facility-wide LUCAP that will include appropriate LUCs for Areas 27, 56, F, R, and S.

Protectiveness Statement

The remedy to restrict residential land use at Areas 27, 56, F, R and S and monitor groundwater at Areas 56 and R remains protective of human health and the environment.

OU13 - Area E - Bldg. 11 Tank Excavation:

History of Contamination and Initial Response

Area E is located adjacent to the facilities of the NJANG operations area. Area E is currently grassed-covered, with no visible evidence of previous site use. A small telephone-switching building is located on the site. Langley Road borders the site to the south. An FAA production well (FAA-5) is located approximately 1,500 feet southeast of Area E.

Area E was formerly the site of a heating plant that supplied heat to many of the buildings in the adjacent portion of the FAA Technical Center. The location of the existing telephone-switching building overlaps a corner of the former heating plant building location. The heating plant building was demolished in 1985 and a 20,000-gallon underground No. 6 fuel-oil storage tank was removed. During removal, some fuel oil was reported to have leaked from the tank. Based on a review of historic aerial photographs, other unidentified structures located north of Langley Road, surrounding the former building location, apparently were demolished in the same general time frame as the former heating plant.

Basis for Taking Action

Contaminants

COCs, as defined in the HHRA for Area E, in each medium include:

Soil	Groundwater
Arsenic	Antimony
Chromium	Arsenic
Copper	Beryllium
Lead	Cadmium
Mercury	Chromium
Selenium	Copper
Toluene	Lead
Xylene (total)	Mercury
Benzo(a)anthracene	Nickel
Benzo(a)pyrene	Selenium
Benzo(b)fluoranthene	Thallium
Benzo(k)fluoranthene	Zinc
Bis(2-ethylhexyl)phthalate	Tetrachloroethene
Chrysene	Toluene
Fluoranthene	1,1,1-Trichloroethane
Phenanthrene	Xylene (total)
Pyrene	Acenaphthene
alpha-Chlordane	Bis(2-ethylhexyl)phthalate
gamma-Chlordane	Fluorene

Soil	Groundwater
Dieldrin	2-Methylnaphthalene
4,4-DDE	Phenanthrene
4,4-DDT	Pyrene
	beta-BHC
	alpha-Chlordane
	gamma-Chlordane
	Chlordane (total)
	Heptachlor epoxide

Human Health Risk Assessment

Risks due to exposures to surface soil and groundwater at Area E were estimated based on a standard commercial/industrial maximum exposure frequency of 250 days/year. Exposures to groundwater assumed the installation of a potable well at the site. Estimated risks based on potential exposures to Area E groundwater exceeded EPA's acceptable risk management criteria for carcinogens and noncarcinogens. Elevated carcinogenic risks associated with exposures to groundwater were mainly attributable to arsenic while elevated noncarcinogenic risks were mainly due to antimony and arsenic. Estimated risks associated with exposures to soil at Area E did not exceed EPA's risk-management criteria.

Ecological Risk Assessment

A quantitative evaluation of ecological risks was originally conducted in 1995, based on site-specific soil data available at that time. After the collection of additional soil data, a supplemental qualitative assessment was conducted which included a limited quantitative evaluation of chlordane in surface soil. The soil COCs used in conducting the ecological risk assessment included arsenic, chromium, copper, lead, mercury, selenium, 4,4-DDE, 4,4-DDT, alpha-chlordane, gamma-chlordane and total chlordane. In the original quantitative risk assessment, exposures of the deer mouse and grasshopper sparrow, representing small mammals and avian primary consumers, respectively, to Area E soils were found to result in a low potential for ecological effects, with EHQs slightly exceeding criteria. For the mouse, copper, selenium and lead contributed most to the total EHQ while for the grasshopper sparrow, lead was the primary contributor to the EHQ exceedance. The qualitative supplemental assessment conducted after the collection of additional soil data indicated that there was little potential for ecological risk in association with the new data, including the detection of chlordane in surface soils.

Remedy Selection

The ROD for Area E was signed on September 26, 2003. The RAOs listed in the ROD are as follows:

- Prevent human exposure due to direct contact with soil contaminants that are present at levels exceeding non-residential direct contact NJSCC;

- Prevent exposure to and migration of free product from the vicinity of the former UST location;
- Prevent existing soil contaminants from adversely impacting groundwater quality (i.e., causing exceedances of state and federal drinking water standards and New Jersey GWQS) in the future;
- Prevent exposure, due to groundwater ingestion, to contaminants that are present at levels exceeding acceptable state and federal drinking water standards and New Jersey GWQS; and
- Prevent the migration of groundwater contaminants from the existing area of groundwater contamination.

The selected remedy for Area E includes the following components:

- Free product extraction and off-site treatment;
- Excavation of petroleum-contaminated soils which exceed New Jersey non-residential direct contact soil cleanup criteria and off-site beneficial reuse or off-site disposal;
- Excavation of pesticide-contaminated soils which exceed New Jersey non-residential direct contact soil cleanup criteria and off-site disposal;
- Ground water extraction;
- On-site ground water treatment using filtration and carbon adsorption, if necessary;
- Reinjection of treated ground water;
- Implementation of a deed notice to prevent future residential development of the site, unless the site is remediated to the standards of New Jersey's residential soil cleanup criteria; and
- Implementation of well restrictions and a groundwater Classification Exception Area to prevent future potable use of the impacted water.

Remedy Implementation and Remedial Systems

Not applicable; remedy has not been implemented. The Area E FS presented a preliminary remedial cost estimate of $1,800,000.

Remedial design activities for Area E have been delayed primarily due to the planned treatment of contaminated groundwater from Area E at the regional groundwater treatment system being constructed at Area D (i.e., the treatment system that will also treat groundwater from Areas D, 41 and B). The proposed remedial design for Area E is scheduled to be completed September 2008, with system construction scheduled to be completed September 2009. The implementation of the groundwater remedy is scheduled to commence in July 2010.

System Operations

Not applicable; remedy has not been implemented.

Data Review

Groundwater

No additional groundwater data have been collected at Area E since the last five-year review.

Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

Not applicable; remedial action has not taken place.

Question B: *Are the exposure assumptions, toxicity data, cleanup levels, and remedial actions objectives used at the time of the remedy still valid?*

Exposure assumptions are still valid as land use has not changed and exposure to groundwater at Area E is not occurring.

The groundwater ARARs defined in the Area E ROD are based on New Jersey GWQS (PQLs). These standards are still current and remain protective of human health, as they are more stringent than MCLs (see Table 16). The only exception is with respect to antimony, where the PQL is 20 ppb, but the MCL is 6 ppb. Antimony was detected in only one well during one round of sampling. Therefore, the use of the PQL as the cleanup standard in the ROD is not expected to adversely impact the protectiveness of the remedy.

The soil cleanup standards defined in the Area E ROD are based on non-residential NJSCC for benzo(a)anthracene, heptachlor and total petroleum hydrocarbons. These standards are still current and remain protective of human health under non-residential site use. Also, no new location-specific or action-specific ARARs have been identified that are not being addressed by the remedy.

Land use at or near the site has not changed and the potential routes of exposure remain the same. Groundwater has not been developed as a potable source of water at the site. In addition, there is currently no soil vapor exposure pathway. No new contaminants or contaminant sources have been identified.

Toxicity values for a few of the contaminants of concern evaluated within the HHRA have changed (see Table 17); however, these changes are not expected to impact the protectiveness of the remedy, since no site-specific, risk-based cleanup levels were used as the basis for the remedy. Groundwater remedial goals are based on PQLs which, for the most part, are more stringent than human-health-based drinking water standards.

No unacceptable ecological risks were identified in the baseline ecological risk assessment based on exposures to site soils. No new information has come to light that would change this conclusion.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No. A land use control plan was attached to the Area E ROD per EPA specifications.

Technical Assessment Summary

According to the data reviewed and the interviews conducted, the existing conditions at Area E remain protective of human health. There have been no changes in site use or in the physical conditions at the site that would affect the protectiveness of the remedy. There is no other information that would call into question the protectiveness of the remedy.

Recommendations

It is recommended that the remedy be designed and constructed as soon as possible.

Protectiveness Statement

The remedy for Area E, Building 11 Tank Excavation, will protect human health and the environment when it is completed. Currently, there is no unacceptable exposure to human or environmental receptors from source area contaminants and none expected over the next five years.

Sites With RODs Pending

OU12 - Areas 2, 3, 5, and 6 - New Jersey Air National Guard Sites:

Site 2- Aircraft Defueling Area

History of Contamination and Initial Response

Site 2, the Aircraft Defueling Area located in the NJANG operations area, consists of a 1,640-foot by 180-foot rectangular area immediately adjacent to the north perimeter of the existing NJANG concrete flight apron. The site is delineated by the FAA property line to the north, by Taxiway H to the east, by the apron edge to the south, and by a line coincident with the apron's western edge to the west. Overall, the large size of the site is a function of the length of the flight apron and the possibility that defueling may have occurred at random points along the entire length of the apron. Two subareas (A and B) were identified as specific areas of defueling. A catch basin is located approximately 50 feet north of the property line on FAA property. In general, the site is a relatively flat, grass-covered area that shows no evidence of any recent defueling activities or surface soil impacts.

Site 2 was used as a defueling area from 1965 to 1975. During this period, aircraft were routinely defueled into tank trucks or bowers. Typically, all the fuel could not be pumped from the aircraft into these receptacles. As a result, residual fuel was regularly discharged to the grassy areas adjacent to the flight apron. A specific event involving the discharge of more than

400 gallons of JP-4 near Subarea B was reported. The actual quantities of JP-4 discharged at the site are unknown, but are estimated to be at least 1,100 gallons.

Site Investigation Results

Site 2 was investigated most recently in 1996 as part of the Supplemental Site Investigation (1999). Results of the surface and subsurface soil investigation indicated that site activities had not contaminated these media, as no soil sample results exceeded the residential NJSCC. Groundwater sample results indicated that all organic compounds detected in the groundwater were present at levels below PQLs while inorganic results indicated that lead, arsenic, and cadmium were present at levels above drinking water standards. These results were from the unconfined aquifer, which is currently not used as a source of drinking water.

Site 3 - Old Aircraft Wash Rack

History of Contamination and Initial Response

Site 3, the Old Aircraft Wash Rack, is located in the NJANG operations area along the north side of Earhart Drive, between Building No. 36 and Building No. 40. The site generally consists of jointed concrete pavement that slopes gently toward Earhart Drive. A concrete retaining wall and two catch basins are positioned on the downgradient end of this paved area. A second retaining wall, perpendicular to the first, separates a third catch basin or drain to the east from the other two drains. This third drain is positioned at a slightly higher elevation than the two western drains. The majority of the adjacent paved parking area also slopes toward these drains and Earhart Drive. A concrete vault and manholes associated with the drains are located south of the paved area adjacent to Earhart Drive.

Site 3 was formerly an aircraft wash rack that was used from 1942 until 1974. It was the primary location of aircraft component cleaning for the Naval Air Station (1942 to 1958) and the NJANG (1958 to 1974). Since 1974, the wash rack area has been used as a parking lot. It was reported that holding tanks and drums containing waste oils were staged at the wash rack area during the 1960s. The waste materials of concern at this site are primarily waste oils, JP-4, and wash-related solvents.

Site Investigation Results

Site 3 was most recently sampled in 2002 during the Expanded Supplementary Site Investigation (ESSI, 2003). Surface soil, subsurface soil, and groundwater were sampled as part of this investigation. Results of the soil investigation did not reveal any contaminants of concern. However, the groundwater investigation indicated a sinking 1,1-dichloroethane plume may warrant further concern. These results were from the unconfined aquifer, which is currently not used as a source of drinking water.

Site 5 - Liquid Waste Holding Area Behind Building 65

History of Contamination and Initial Response

Site 5, the Liquid Waste Holding Area behind Building 65, is located in the NJANG operations area, adjacent to the intersection of Bleriot Court and Byrd Highway, behind the NJANG Vehicle Maintenance Compound. The site consists of a 75-foot by 165-foot rectangular area. A fence enclosing the maintenance compound forms the site's northern and eastern borders. The area immediately west of the site is paved with asphalt and used for parking. The area south of the site has a gravel base and is used to stage various types of equipment. Vehicles are typically parked on the unpaved surface of the site, which is evident from visible fuel and/or oil stains on the soil. A divided concrete containment pad, approximately 45-feet square, is present in the eastern part of the site. The northern half of the pad is used to store drums containing waste oils, solvents, and engine coolants. The southern half of the pad contains two steel aboveground storage tanks that are used to store waste fuel and waste-fuel products and several empty to partly-filled drums of unidentified material.

Site 5 has been in operation since 1958. It was reported that disabled vehicles, including fuel tank trucks, have been parked on the unpaved surface area. Shallow soils at the site contain adsorbed oils to a depth of at least 8 to 10 inches. Also, small quantities of JP-4 may have been discharged to the soil in this area. Fluid wastes have been stored at the site for a number of years. Prior to 1988, as many as 100 drums containing waste fluids may have been simultaneously stored here. The wastes of concern are JP-4, waste oils and solvents. A Resource Conservation and Recovery Act (RCRA) corrective action at this site has only been partially completed (i.e., an underground storage tank and only a limited amount of impacted soils removed from the excavation).

Site Investigation Results

Site 5 was most recently sampled during 2002 as part of the ESSI. Other than contaminated soils associated with the underground storage tank, soil sampling did not identify any contaminants of concern. Groundwater sampling indicated impacts downgradient of the former underground storage tank, where elevated levels of aromatic hydrocarbons were detected in the groundwater. If the corrective action is completed and the source of groundwater contamination removed, it is expected that impacts to the groundwater will diminish. It should be noted that groundwater impacts are detected in the unconfined aquifer, which is currently not used as a source of drinking water.

Site 6 - Drum Burial at Blast Pad Near Alert Area

History of Contamination and Initial Response

Site 6, the Drum Burial at Blast Pad near Alert Area, is located northeast of the NJANG Alert Area and a short distance northwest of the intersection of Runways 13-31 and 4-22. The site consists of a 130-foot by 90-foot rectangular area on the east side of an abandoned blast pad. A partially-buried drum was located in the soil approximately 47 feet south and 8 feet east of the

northeast pad corner. The drum was vertically oriented, approximately 3 to 4 inches above the ground surface, and full of fluid. An empty metal storage trailer previously used to store waste material (spent fuel filters, paint cans, miscellaneous debris, etc.) is also present at the site. Open fields associated with the airport runways lie adjacent to the blast pad and form the immediate site vicinity.

The abandoned blast pad was used as a jet-engine test site. The length of time that the test pad was used is unknown; however, NJANG personnel indicated that testing at this site ceased sometime during the early 1980s. The partially buried drum may have been used as a receptacle for discarding spent fuel filters and/or minor amounts of jet fuel. The drum and surrounding soils have been recently removed and properly disposed. The major waste of concern at this site is JP-4.

Site Investigation Results

Surface soil samples were most recently collected in 2002 as part of the ESSI. Results from this investigation indicated the presence of SVOCs in surface soil at levels exceeding residential NJSCC. Groundwater was most recently sampled in 1996 as part of the 1999 Supplemental Site Investigation. No organic compounds were detected in the groundwater at levels exceeding PQLs; lead and cadmium were detected at levels exceeding drinking water standards. These results were from the unconfined aquifer, which is currently not used as a source of drinking water.

Recommendations

It is recommended that the remedial investigations for these sites be completed as soon as possible. In addition, the RCRA corrective action should be completed at Site 5 in order to mitigate the further migration of groundwater contamination.

Protectiveness Statement

No change in land use has occurred at Sites 2, 3, 5, and 6 which would contribute to unacceptable exposure to site contaminants.

OU14 - Area U - South Branch Absecon Creek/North Branch Absecon Creek Watersheds

History of Contamination and Initial Response

Area U consists of the South Branch of Absecon Creek (SBAC) and the North Branch of Absecon Creek (NBAC) watersheds. Both the SBAC and the NBAC bisect a large portion of the FAA Technical Center property and their watersheds include the Upper and Lower Atlantic City Reservoirs (Upper and Lower Reservoirs). Atlantic City's municipal water supply is provided by nine production wells located on FAA Technical Center property along the northern edge of the Upper Reservoir, and by water drawn directly from the Lower Reservoir, which is not on FAA Technical Center property. The SBAC drains into the Upper Reservoir which in turn

drains into the Lower Reservoir. In addition to drainage received from the Upper Reservoir, the Lower Reservoir is also fed by the NBAC and another unnamed tributary.

In 1936, the City dammed both the SBAC and NBAC to create the Upper and Lower Atlantic City Reservoirs, respectively. In the 1940s, the Atlantic City Municipal Airport and a U.S. Naval Air Station were established at the site. In 1958, the FAA was established and took over the operation of the facility, with continuous facility operation and maintenance to present. As previously mentioned, the South Jersey Transit Authority (operator of the Atlantic City International Airport) and NJANG maintain their respective facilities within the FAA Technical Center property line. In varying degrees, these different site uses have contributed to contamination of the SBAC and NBAC watersheds.

Remedial Investigation Results

The SBAC and NBAC watersheds have been subject to numerous investigations. The primary contaminant detected in Area U is mercury. Mercury was first detected in SBAC sediment during the facility-wide EI/FS conducted between 1987 and 1990. The most heavily-contaminated area occurs in the SBAC downstream of Tilton Road. Fish tissue sampling conducted in the Upper Reservoir by NJDEP in 1993 identified elevated levels of mercury in largemouth bass. Although fishing is not allowed in either reservoir, trespassers have historically been known to fish in the Lower Reservoir. The Upper Reservoir is much less accessible to trespassers because access to the reservoir is controlled by FAA's security system. Since the terrorist activities of 2001, security has been upgraded by the FAA Technical Center and also by the Atlantic City Municipal Authority, which owns the Lower Reservoir. In addition to restricting access to the reservoirs, a "do not eat" fishing advisory is in effect for bass, pickerel and perch in the Atlantic City Reservoir (the advisory also notes that fishing is not allowed in the Atlantic City Reservoir). The advisory can be found on the web at: http://www.state.nj/dep/dsr/fishadvisorybrochure-final.pdf.

The USFWS conducted a facility-wide ERA in 1994 and a follow-up mercury investigation in 1997. The 1997 study concluded that some level of remedial action was warranted based on potential adverse impacts to benthic organisms and the potential risk to higher trophic levels. FAA submitted a RI Report on Area U in 2003 based on environmental sampling completed in 2001. The investigation was not successful in locating the source of the mercury contamination but better identified the extent of mercury contamination in sediment and groundwater. FAA is conducting follow-up sampling in 2004 in order to further define the extent of mercury contamination, its ecological effects, and also its source. The additional studies will also better define the ecological values of the contaminated areas to support subsequent evaluations of the impacts of potential remedial actions on the ecological resources (e.g., Atlantic White Cedar swamps) that would be impacted by remedial activities.

Recommendations

It is recommended that FAA complete the RI/FS for Area U as soon as possible in order to progress towards an ecologically protective final remedy.

Protectiveness Statement

While the RI of Area U continues, it has been determined that no unacceptable exposure to Area U contaminants is occurring.

5.0 Five-Year Review Process

Administrative Components

The first five-year review for FAA was completed in 1999, thus creating the trigger for this second five-year review to be completed in 2004.

For this five-year review, the review team consisted of EPA representatives William Roach (RPM), John Malleck (Federal Facilities Section Chief), Edward Modica (Hydrogeologist), Michael Sivak (Risk Assessor), and Christopher Stitt (Biological Technical Assistance Group or BTAG). Also supporting the completion of the review were Keith Buch (FAA - Program Manager), Tom Hupf (FAA - Ecological Studies Manager), Larry Butlien (TRC Environmental Corporation (TRC), Remedial Investigation Manager), Barry Kline (TRC, Remedial Design Engineer), Jean Oliva (TRC, Feasibility Study Manager), Cliff James (URS Corporation, Remedial Systems Operations Manager), and Mac Walling (URS Corporation, Remedial Construction Manager).

Community Involvement **{**tc "*Community Involvement* " \l 2**}**

A newspaper notice will be placed in The Press of Atlantic City.

Document Review **{**tc "*Document Review* " \l 2**}**

The five-year review consisted of a review of relevant documents including the following:

- RI/FS Reports (including human health and ecological risk assessments)
- Records of Decision
- Site Investigation for NJANG Sites 2, 3, 5 and 6, 1996 & 1999
- Expanded Supplemental Site Investigation for NJANG Sites 3, 5 and 6, 2003
- Remedial Investigation Report for Area U, 2003
- First Five-Year Review Report for FAA, 1999
- USEPA Five-Year Review Guidance, 2001
- NJDEP Fishing Advisory, 2004
- New Jersey Soil Cleanup Criteria (last revised May 1999)
- New Jersey Ground Water Quality Standards (NJAC 7:9-6, Appendix Table 1)
- New Jersey MCLs (NJAC 7:10-5.2(a)(4))
- New Jersey NJPDES DGW Permit Equivalents for Areas D, 20A and 29

Data Review **{**tc "*Data Review* " \l 2**}**

Data reviewed as part of the five-year review included the following:

- Quarterly Ground Water and Surface Water Sampling Results Reports (1999 - 2003)
- Area 29 NJPDES DGW Baseline Ground Water Sampling Results Reports (2002, 2003)
- Remedial system operating, monitoring and cost data for Areas D, 20A and 29 (provided by URS Corporation)
- Hydrogen Release Compound (HRC®) and Oxygen Release Compound (ORC®) at FAA Technical Center - Area 20A and Area D Report (2003)

Site Inspection

The site inspection took place on May 13, 2004 and was attended by William Roach, Edward Modica, Christopher Stitt, and Julie McPherson (risk assessor) of EPA; Keith Buch and Tom Hupf of FAA; Robert Smith, Jean Oliva, Larry Butlien and Barry Kline of TRC; and Cliff James of URS. The purpose of the inspection was to assess the protectiveness of the various sites, including a review of current land use conditions, access restrictions and operating remedial systems. No significant issues were identified during the site inspection.

Interviews

Interviews consisted of discussions with the FAA, TRC and URS representatives listed above under the "Administrative Components" heading during the site inspection.

6.0 Recommendations and Follow-Up Actions

There are no recommendations or follow-up actions directly associated with this review. This site has various ongoing remedial investigations, studies, designs and actions. Within this report, there are a number of "recommendations" made in relationship to specific operable units and source areas. The purpose of these recommendations is to identify and encourage progress for the various ongoing activities needed at this site. The EPA expects to continue a dialog with the FAA to resolve a number of the issues raised. EPA and the FAA are not bound by any of the specific recommendations found in this report. However, EPA expects the FAA to continue making significant progress in the remediation of all site risks.

The previous five-year review also contained a number of "recommendations" associated with the on-going activities at this site. These previous "recommendations" were considered within the specific evaluations done for each operable unit.

The current site use provides for restricted access to site soils and groundwater. This provides temporary protection to human health and the environment. However, the long-term costs for maintaining engineered and institutional controls can be significant. EPA has requested the FAA to develop a facility-wide LUCAP in order to prevent unacceptable exposure to residual contamination from occurring. Of the 5,062 acres of this site, approximately 4,427 acres are considered suitable for "unrestricted use" under CERCLA requirements. The balance, approximately 630 acres, is unsuitable for unrestricted use due to on-going remedial action and/or residual contamination remaining at a site.

7.0 Protectiveness Statement

Final site remedy decisions have not been made. Until final remedy decisions are completed, an opinion on site-wide protectiveness cannot be made. 40 CFR 300.430(F)(4)(i) pertains to these remedial actions that have been selected and implemented. The selected remedial actions for this site will protect human health and the environment when they are completed. Existing site use restricts human exposure - so that human exposure is currently under control. While some of the individual groundwater plumes may not be fully under control, these plumes are sufficiently known to not directly threaten drinking-water supplies and are not expected to do so over the next five years. In addition, unacceptable exposure to contaminated soil and sediment is not expected to occur due to restricted site use and site access. Consequently, for this site, human health is considered adequately protected. The selected remedies also protect the environment. Remedies have not been selected for OU12 and OU14. There does not appear to be any unacceptable environmental exposures at OU12. The environmental exposures at OU14 are still being investigated; however, a fishing restriction provides some protection of human health.

8.0 Next Review

The next Five-Year Review for the FAA Technical Center should be completed before September 2009.

Approved:

Keith C. Buch

Keith C. Buch
Program Manager
FAA William J. Hughes Technical Center

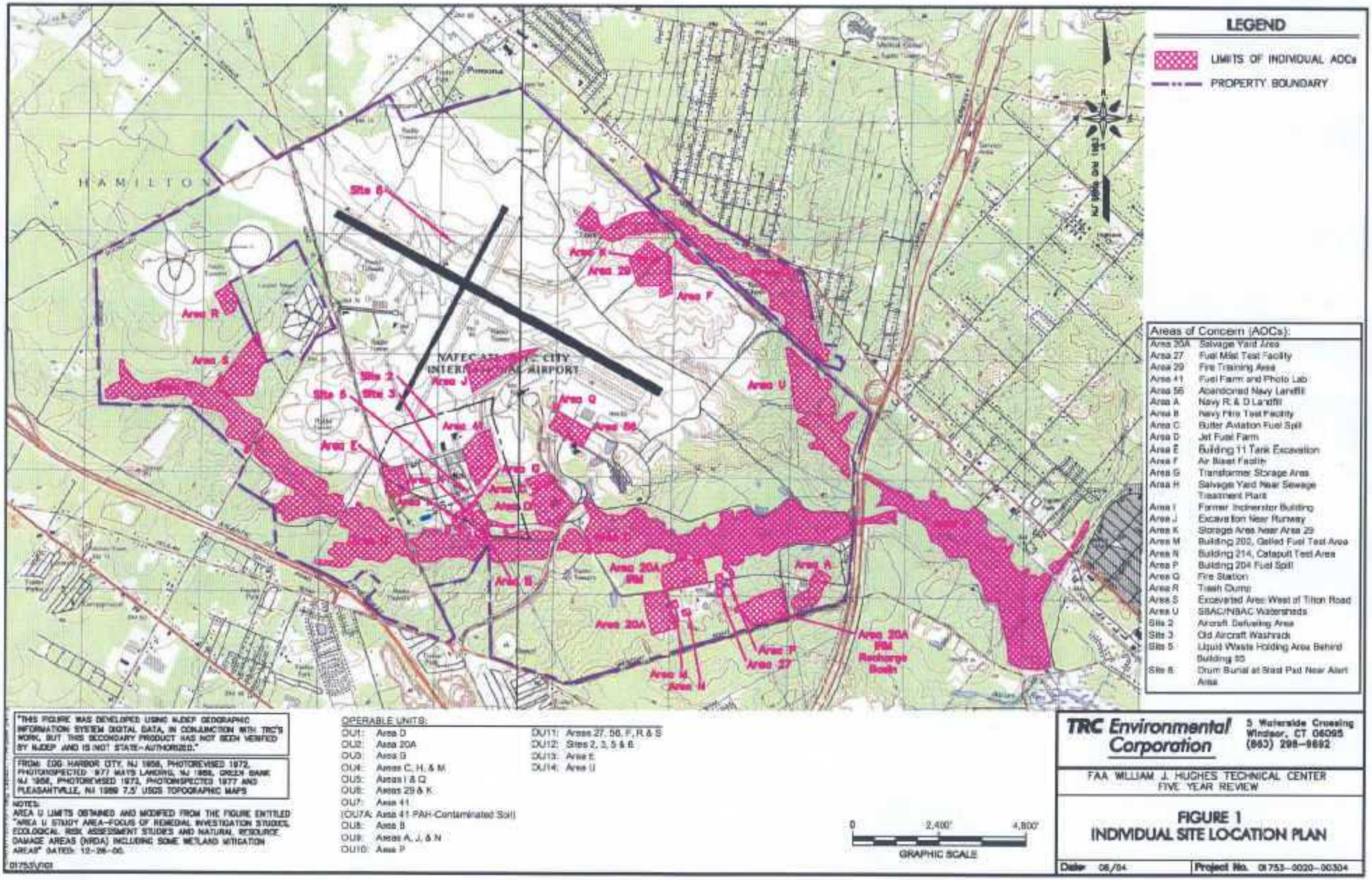
9/21/04
Date

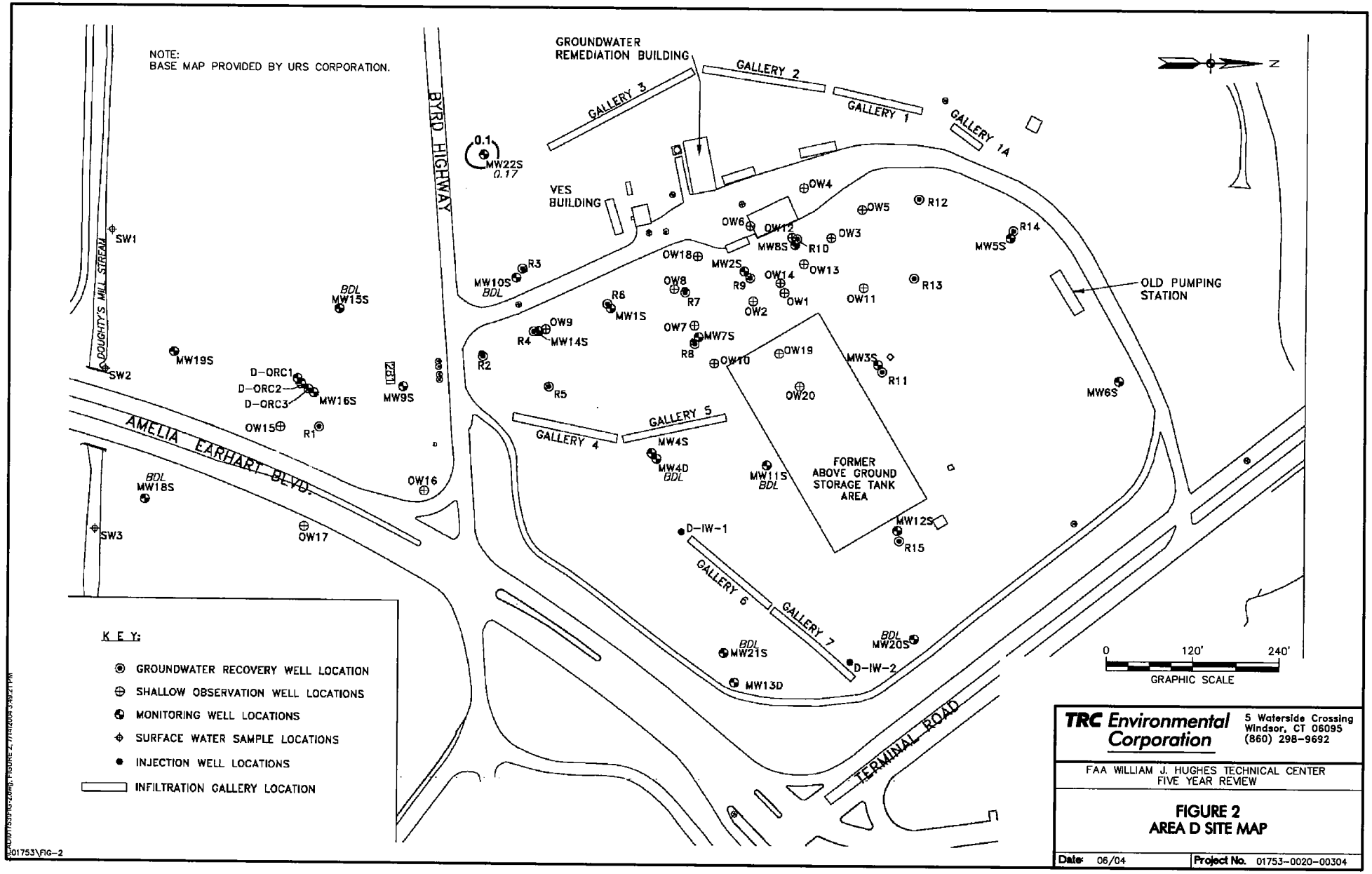
List of Acronyms

AMB	Airways Modernization Board
ARARs	Applicable or Relevant and Appropriate Requirements
AVGAS	Aviation Gasoline
beta-BHC	beta-Benzene Hexachloride
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
BTAG	Biological Technical Assistance Group
CEA	Classification Exception Area
CEM	Continuous Emission Monitoring
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act, as amended
COCs	Contaminants of Concern
1,1-DCE	1,1-Dichloroethene
4,4-DDE	4,4-Dichlorodiphenyldichloroethylene
4,4-DDT	4,4-Dichlorodiphenyltrichloroethylene
DGW	Discharge to Ground Water
DO	Dissolved Oxygen
EHQ	Ecological Hazard Quotient
EI	Environmental Investigation
EPA	(United States) Environmental Protection Agency
EPC	Exposure Point Concentration
ERA	Ecological Risk Assessment
ESD	Explanation of Significant Differences
ESSI	Expanded Supplementary Site Investigation
FAA	Federal Aviation Administration
FFA	Federal Facility Agreement
FS	Feasibility Study
gpm	Gallons per minute
GSA	General Services Administration
GWQS	Ground Water Quality Standard
HHRA	Human Health Risk Assessment
HRC®	Hydrogen Release Compound
LUCs	Land Use Controls
LUCAP	Land Use Control Assurance Plan
MCL	Maximum Contaminant Level
NAFEC	National Aviation Facilities Experimental Center
NJANG	New Jersey Air National Guard
NJDEP	New Jersey Department of Environmental Protection
NJPDES	New Jersey Pollutant Discharge Elimination System
NJSCC	New Jersey Soil Cleanup Criteria
NBAC	North Branch of Absecon Creek
O&M	Operation and Maintenance
ORC®	Oxygen Release Compound
ORP	Oxidation-Reduction Potential

OSWER	Office of Solid Waste and Emergency Response (EPA)
OU	Operable Unit
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PCE	`Tetrachloroethene (also referred to as perchloroethene)
PP	Priority Pollutant
ppb	Parts per billion
PQLs	Practical Quantitation Limits
R&D	Research and Development
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SBAC	South Branch of Absecon Creek
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compound
TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
TCL/TAL	Target Compound List/Target Analyte List
TDS	Total Dissolved Solids
TSCA	Toxic Substances Control Act
TPH	Total Petroleum Hydrocarbons
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
UXO	Unexploded Ordnance
VOCs	Volatile Organic Compounds

Figures


LEGEND
LIMITS OF INDIVIDUAL AOCs
PROPERTY BOUNDARY
HAMILTON
Pomona
Site 6
Area R
Area S
Site 2
Site 3
Site 5
Area J
Area 41
Area E
Area Q
Area 56
Area G
Area I
Area D
Area C
Area B
Area 20A
Area 20A Rifle Recharge Basin
Area M
Area H
Area K
Area 29
Area F
Area U
Area A
Area 27
Areas of Concern (AOCs):
Area 20A Salvage Yard Area
Area 27 Fuel Mist Test Facility
Area 29 Fire Training Area
Area 41 Fuel Farm and Photo Lab
Area 56 Abandoned Navy Landfill
Area A Navy R & D Landfill
Area B Navy Fire Test Facility
Area C Butler Aviation Fuel Spill
Area D Jet Fuel Farm
Area E Building 11 Tank Excavation
Area F Air Blast Facility
Area G Transformer Storage Area
Area H Salvage Yard Near Sewage Treatment Plant
Area I Former Incinerator Building
Area J Excavation Near Runway
Area K Storage Area Near Area 29
Area M Building 202, Galled Fuel Test Area
Area N Building 214, Catapult Test Area
Area P Building 204 Fuel Spill
Area Q Fire Station
Area R Trash Dump
Area S Excavated Area West of Tilton Road
Area U SBAC/NBAC Watersheds
Site 2 Aircraft Defueling Area
Site 3 Old Aircraft Washrack
Site 5 Liquid Waste Holding Area Behind Building 55
Site 6 Drum Burial at Blast Pad Near Alert Area
"THIS FIGURE WAS DEVELOPED USING NJDEP GEOGRAPHIC INFORMATION SYSTEM DIGITAL DATA, IN CONJUNCTION WITH TRC'S WORK, BUT THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY NJDEP AND IS NOT STATE-AUTHORIZED."
FROM: EGG HARBOR CITY, NJ 1956, PHOTOREVISED 1972, PHOTOINSPECTED 1977 MAYS LANDING, NJ 1956, GREEN BANK NJ 1956, PHOTOREVISED 1972, PHOTOINSPECTED 1977 AND PLEASANTVILLE, NJ 1969 7.5' USGS TOPOGRAPHIC MAPS
NOTES:
AREA U LIMITS OBTAINED AND MODIFIED FROM THE FIGURE ENTITLED "AREA U STUDY AREA-FOCUS OF REMEDIAL INVESTIGATION STUDIES, ECOLOGICAL RISK ASSESSMENT STUDIES AND NATURAL RESOURCE DAMAGE AREAS (NRDA) INCLUDING SOME WETLAND MITIGATION AREAS" DATED: 12-26-06.
01753\U101
OPERABLE UNITS:
OU1: Area D
OU2: Area 20A
OU3: Area B
OU4: Areas C, H, & M
OU5: Areas I & Q
OU6: Areas 29 & K
OU7: Area 41
(OU7A: Area 41 PAH-Contaminated Soil)
OU8: Area B
OU9: Areas A, J, & N
OU10: Area P
OU11: Areas 27, 56, F, R & S
OU12: Sites 2, 3, 5 & 6
OU13: Area E
OU14: Area U
0 2,400' 4,800'
GRAPHIC SCALE
TRC Environmental Corporation
5 Waterside Crossing
Windsor, CT 06095
(860) 298-9692
FAA WILLIAM J. HUGHES TECHNICAL CENTER
FIVE YEAR REVIEW
FIGURE 1
INDIVIDUAL SITE LOCATION PLAN
Date 06/04
Project No. 01753-0020-00304



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(860) 298-9692

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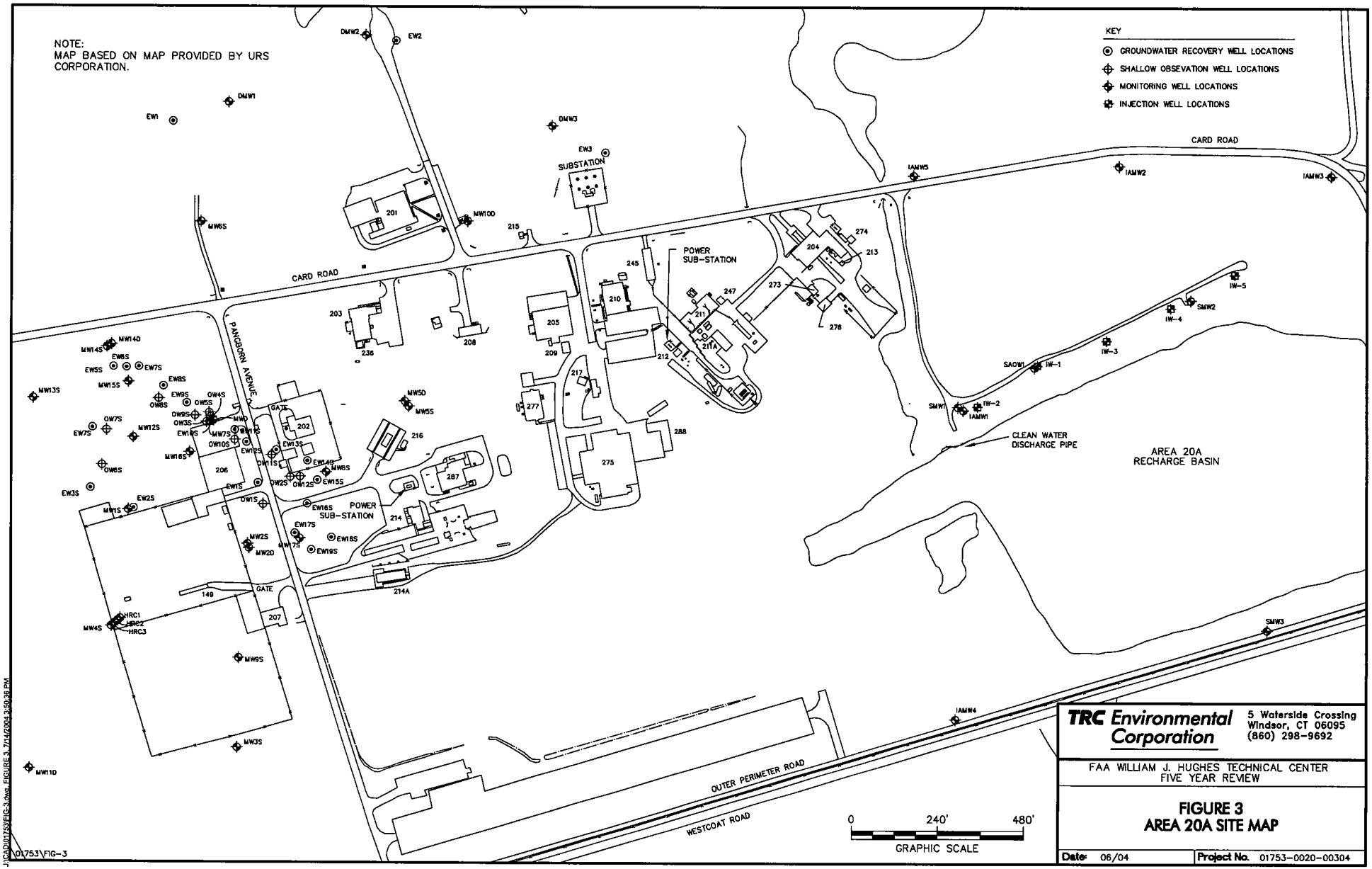
FIVE YEAR REVIEW

FIGURE 2
AREA D SITE MAP

Date: 06/04 | Project No. 01753-0020-00304

01753\FIG-2



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FIVE YEAR REVIEW

FIGURE 3
AREA 20A SITE MAP

Date: 06/04 | Project No. 01753-0020-00304

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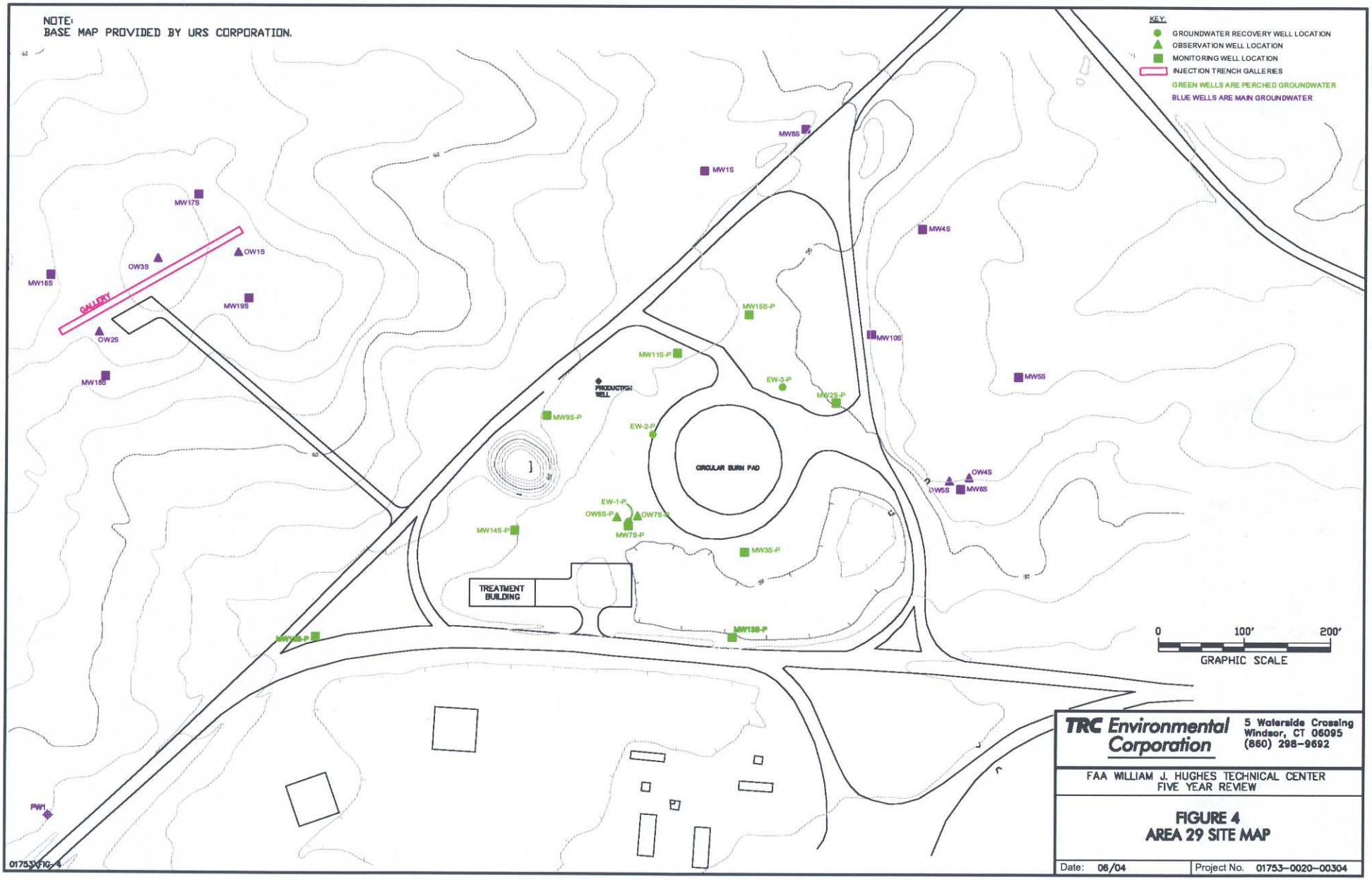
01753\FIG-3



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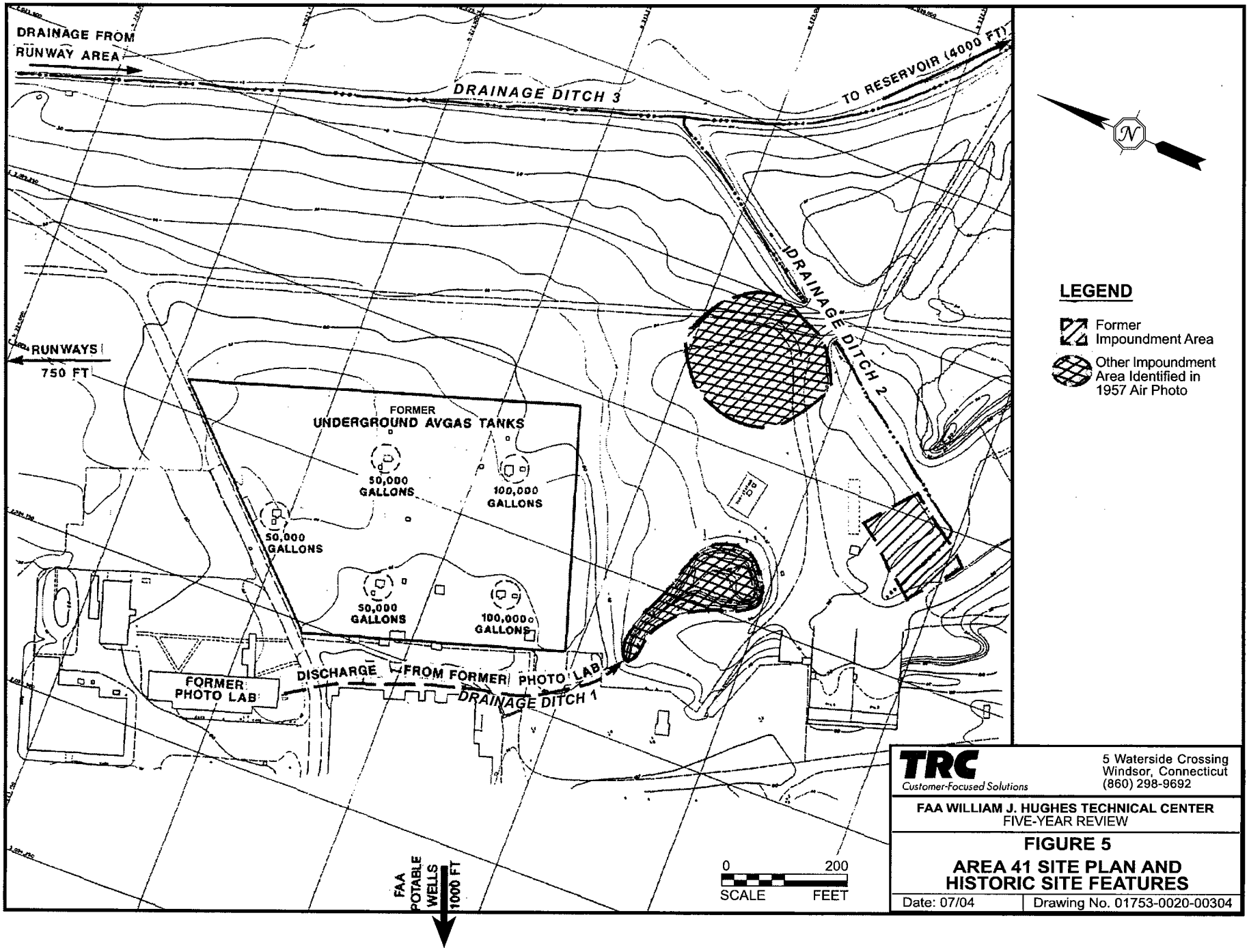
FIVE YEAR REVIEW

FIGURE 4
AREA 29 SITE MAP

Date: 06/04 | Project No. 01753-0020-00304



faa/area 41/historic site features

TRC
Customer-Focused Solutions

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Windsor, Connecticut
(860) 298-9692

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FIVE-YEAR REVIEW

FIGURE 5
AREA 41 SITE PLAN AND HISTORIC SITE FEATURES

Date: 07/04 | Drawing No. 01753-0020-00304

Tables

TABLE 1

ESTIMATED VOLUME OF FREE PRODUCT REMOVED FOR DISPOSAL
DECEMBER 1988 - PRESENT
AREA D - JET FUEL FARM
FAA William J. Hughes Technical Center

Time Period	Volume Removed for Off-Site Disposal (gal)	Source	Average Volume Removed per day (gpd)
12/88 - 8/90	50,000	TRC (disposal invoices)	83
9/90 - 2/95	96,100 [estimated]	[estimated]	60 [estimated]
2/21/95 - 12/95	13,465	Aguilar	44
1/96 - 12/96	8,545	Aguilar	23
1/97 - 12/97	3,102	Aguilar	8.5
1/98 - 12/98	7,858	Aguilar/Radian (URS)	22
1/99 - 12/99	2,448	URS	6.7
1/00 - 12/00	7,530	URS	21
1/01 - 12/01	1,756	URS	4.8
1/02 - 12/02	3,763	URS	10
1/03 - 12/03	2,062	URS	5.6
1/04 - 3/29/04	87	URS	1

196,716 gallons - Estimated total volume of free-phase product removed

TABLE 2
COMPARISON OF ROD GROUNDWATER ARARS TO CURRENT ARARS AND NJPDES DISCHARGE TO GROUNDWATER PERMIT EQUIVALENT REQUIREMENTS
AREA D - JET FUEL FARM
FAA William J. Hughes Technical Center

Contaminant	Max. Conc. Detected in Groundwater[1] (ug/L)	ARARs Specified in ROD (ug/L)			Current ARARs (ug/L)		
		NJ MCL	Federal MCL	NJ Ground Water Quality Standard[2]	NJ MCL[3]	Federal MCL	NJ Ground Water Quality Standard (PQL)[4]
Benzene	4,000	1			1	5	1
Ethylbenzene	530		700	50[5]		700	5
Toluene	3,100		2,000	50[5]		1,000	5
Xylene	4,700	44			1,000	10,000	2
Naphthalene	1,000			50[5]	300	--	--
Phenol	361			300		--	10
Chromium	192	50				100	10
Lead	68	50				15[6]	10

[1] Includes EI/FS results, not including free product concentrations
[2] At the time the ROD was signed
[3] Federal MCLs incorporated by reference for all other compounds
[4] GWQS are background groundwater quality or PQLs, whichever are higher; PQLs are listed here
[5] Combined total not to exceed 50.0 ug/L
[6] Action level for lead

TABLE 3
COMPARISON OF ROD SOIL ARARS TO CURRENT SOIL CLEANUP CRITERIA
AREA D - JET FUEL FARM
FAA William J. Hughes Technical Center

Compound	Max. Concentration Detected in Soil (ppm)	ARAR in ROD (ppm)	New Jersey Soil Cleanup Criteria (last revised 5/99) (ppm)		
			Residential Direct Contact	Non-Residential Direct Contact	Impact to Ground Water
Benzene	0.16		3	13	1
Toluene	0.15		1,000	1,000	500
Ethylbenzene	0.16		1,000	1,000	100
Xylenes (total)	0.56		410	1,000	67
Total VOCs	5.61[1]	1	1,000	1,000	1,000
Total Organics	18,500[2]	100	10,000	10,000	10,000

[1] Maximum total VOC concentration includes tentatively identified compounds
[2] Represents maximum total petroleum hydrocarbons measurement in subsurface soils

TABLE 4
COMPARISON OF TOXICITY VALUES USED IN HHRA TO CURRENT VALUES FOR COCs
AREA D - JET FUEL FARM
FAA William J. Hughes Technical Center

Contaminant	Oral Carcinogenic Potency Factor $(mg/kg/day)^{-1}$		Reference Dose (mg/kg/day)	
	Value used in HHRA	Current Value	Value used in HHRA	Current Value
Benzene	2.9E-02	5.5E-02	NA	4.00E-03
Ethylbenzene	NA	NA	1.00E-01	1.00E-01
Toluene	NA	NA	3.00E-01	2.00E-01
Xylene	NA	NA	2.00E+00	2.00E-01
Naphthalene	NA	NA	4.00E-01	2.00E-02
2-Chlorophenol	NA	NA	1.73E-05	5.00E-03
Phenol	NA	NA	6.00E-01	3.00E-01
Chromium	NA	NA	5.00E-03	3.00E-03
Nickel	NA	NA	2.00E-02	2.00E-02
Lead	NA	NA	1.40E-03	NA

TABLE 5
COMPARISON OF ROD GROUNDWATER ARARS TO CURRENT ARARS AND NJPDES DISCHARGE TO GROUNDWATER PERMIT EQUIVALENT REQUIREMENTS
AREA 20A - SALVAGE YARD AREA
FAA William J. Hughes Technical Center

Contaminant	Max. Concentration Detected in Groundwater (ug/L)[1]	ARARs Specified in ROD (ug/L)			Current ARARs (ug/L)		
		NJ MCL	Federal MCL	NJ Ground Water Quality Standard[2]	NJ MCL[3]	Federal MCL	NJ Ground Water Quality Standard (PQL)[4]
1,1-Dichloroethene	180	2	7	2	2	7	2
1,1,1-Trichloroethene	2,300	26	200	26	30	200	1
Tetrachloroethene	98	1	5	1	1	5	1
Toluene	ND[5]		2,000			1,000	5
Bis(2-ethylhexyl)phthalate	11,000			5		6	30
4,4-DDT	ND[5]			0.001			0.06
PCBs	ND[5]	0.5		0.001		0.5	0.5
Cadmium	24.7	10	10	10		5	2
Chromium	1,040	50	50	50		100	10

[1] Includes EI/FS results
[2] At the time the ROD was signed
[3] Federal MCLs incorporated by reference for all other compounds
[4] GWQS are background groundwater quality or PQLs, whichever are higher; PQLs are listed here
[5] ND = not detected; ARARs for these compounds were included in the ROD because they were detected in soil and had the potential to impact ground water quality

TABLE 6
COMPARISON OF ROD & ESD SOIL ARARS TO CURRENT SOIL CLEANUP CRITERIA
AREA 20A - SALVAGE YARD AREA
FAA William J. Hughes Technical Center

Compound	Max. Detected Soil Conc. (ppm)	ARAR in ROD/ESD (ppm)	New Jersey Soil Cleanup Criteria (last revised 5/99) (ppm)		
			Residential Direct Contact	Non-Residential Direct Contact	Impact to Ground Water
Toluene	1.3		1,000	1,000	500
Tetrachloroethene	3.8		4	6	1
Total VOCs		1	1,000	1,000	1,000
Total SVOCs		10			
PCBs	1,400	2 (0 - 24 inches) 25 (> 24 inches)	0.49	2	50
Total Organics		100[1]	10,000	10,000	10,000

[1] Represents maximum total petroleum hydrocarbons action level

TABLE 7
COMPARISON OF TOXICITY VALUES USED IN HHRA TO CURRENT VALUES FOR COCs
AREA 20A - SALVAGE YARD AREA
FAA William J. Hughes Technical Center

Contaminant	Oral Carcinogenic Potency Factor $(mg/kg/day)^{-1}$		Reference Dose (mg/kg/day)	
	Value used in HHRA	Current Value	Value used in HHRA	Current Value
1,1-Dichloroethene	5.80E-01	NA	1.00E-02	5.00E-02
1,1,1-Trichloroethane	NA	NA	5.40E-01	2.00E-01
Tetrachloroethene	5.10E-02	5.20E-02	2.00E-02	1.00E-02
Toluene	NA	NA	3.00E-01	2.00E-01
Bis(2-ethylhexyl)phthalate	NE	1.40E-02	NE	2.00E-02
4,4-DDT	3.40E-01	3.40E-01	NA	5.00E-04
PCBs (Aroclor 1260)	4.34E+00	Soil: 2.00E+00 Water: 4.00E-01	3.00E-4	NA
Cadmium	6.10E+00	NA	5.00E-04	Soil: 1.00E-03 Water: 5.00E-04
Chromium	NA	NA	2.10E-03	3.00E-03 (hex chrome)

TABLE 8
COMPARISON OF ROD GROUNDWATER ARARS TO CURRENT ARARS AND NJPDES DISCHARGE TO GROUNDWATER PERMIT EQUIVALENT REQUIREMENTS
AREA 29 - FIRE TRAINING AREA AND AREA K - STORAGE AREA
FAA William J. Hughes Technical Center

Contaminant	Max. Conc. Detected in Groundwater[1] (ug/L)	ARARs Specified in ROD (ug/L)			Current ARARs (ug/L)		
		NJ MCL	Federal MCL	NJ Ground Water Quality Standard (PQL)[2]	NJ MCL[3]	Federal MCL	NJ Ground Water Quality Standard (PQL)[2]
Benzene	1,900	1	5	1	1	5	1
Ethylbenzene	1,100		700	5		700	5
Methylene Chloride	56	2		2	3		2
Toluene	1,900		1,000	5		1,000	5
Xylene (total)	3,500	44	10,000	2	1,000	10,000	2
Tetrachloroethene	3	1	5	1	1	5	1
1,1,1-Trichloroethane	100	26	200	1	30	200	1

[1] Includes EI/FS monitoring results, quarterly monitoring results and NJPDES-DGW baseline sample results.
[2] GWQS are background groundwater quality or PQLs, whichever are higher; PQLs are listed here
[3] Federal MCLs incorporated by reference for all other compounds

TABLE 9
COMPARISON OF ROD SOIL ARARS TO CURRENT SOIL CLEANUP CRITERIA
AREA 29 - FIRE TRAINING AREA AND AREA K - STORAGE AREA
FAA William J. Hughes Technical Center

Compound	Max. Concentration Detected in Soil (ppm)	ARAR in ROD (ppm)	New Jersey Soil Cleanup Criteria (last revised 5/99) (ppm)		
			Residential Direct Contact	Non-Residential Direct Contact	Impact to Ground Water
PCBs	24	2	0.49	2	50
Total Organics	14,000[1]	10,000	10,000	10,000	10,000

[1] Represents maximum detected level of total petroleum hydrocarbons

TABLE 10
COMPARISON OF TOXICITY VALUES USED IN HHRA TO CURRENT VALUES FOR COCs
AREA 29 - FIRE TRAINING AREA AND AREA K - STORAGE AREA
FAA William J. Hughes Technical Center

Contaminant	Oral Carcinogenic Potency Factor $(mg/kg/day)^{-1}$		Reference Dose (mg/kg/day)	
	Value used in HHRA	Current Value	Value used in HHRA	Current Value (chronic)
1,1-Dichloroethane	5.80E-01	NA	9.00E-03	1.00E-01
Benzene	5.20E-02	5.50E-02	7.00E-04	4.00E-03
Toluene	NA	NA	3.00E-01	2.00E-01
Bis(2-ethylhexyl)phthalate	6.84E-04	1.40E-02	6.00E-01	2.00E-02
PCBs (Aroclor 1260)	4.34E+00	Soil: 2.00E+00 Water: 4.00E-01	3.00E-04	NA

TABLE 11
COMPARISON OF ROD GROUNDWATER ARARS TO CURRENT ARARS
AREA 41 - FUEL FARM AND PHOTO LAB AREA
FAA William J. Hughes Technical Center

Contaminant	Max. Conc. Detected in Groundwater[1] (ug/L)	ARARs Specified in ROD (ug/L)			Current ARARs (ug/L)		
		NJ MCL	Federal MCL	NJ Ground Water Quality Standard (PQL)[2]	NJ MCL[3]	Federal MCL	NJ Ground Water Quality Standard (PQL)[2]
Benzene	230	1	5	1	1	5	1
Chlorobenzene	1	50		2	50		2
Chloroform	14			1		80	1
4,4-DDD	(in product only at 3,000,000)			0.1			0.1
4,4-DDT	0.9			0.1			0.1
Ethylbenzene	1,000		700	5		700	5
Toluene	16,000		1,000	5		1,000	5
Xylene (total)	11,000	1,000	10,000	2	1,000	10,000	2
1,1,1-Trichloroethane	3	3	5	2	3	5	2
Arsenic	26		50	8		10	8
Cadmium	38		5	2		5	2
Chromium	230		100	10		100	10
Lead	286		15[4]	10		15[4]	10
Zinc	200			30			30

[1] Includes EI/FS monitoring results and quarterly monitoring results.
[2] GWQS are background groundwater quality or PQLs, whichever are higher; PQLs are listed here.
[3] Federal MCLs incorporated by reference for all other compounds
[4] Action level for lead

TABLE 12
COMPARISON OF ROD SOIL ARARS TO CURRENT SOIL CLEANUP CRITERIA
AREA 41 - FUEL FARM AND PHOTO LAB AREA
FAA William J. Hughes Technical Center

Compound	Max. Concentration Detected in Soil/Sediment (ppm)[1]	ARAR in ROD (ppm)	New Jersey Soil Cleanup Criteria (last revised 5/99) (ppm)		
			Residential Direct Contact	Non-Residential Direct Contact	Impact to Ground Water
Benzo(a)pyrene	1.1	0.66	0.66	0.66	100
PCBs	350	2	0.49	2	50
Total Organics	18,100[2]	10,000	10,000	10,000	10,000

[1] Includes EI/FS data and USFWS ERA data.
[2] Represents maximum total petroleum hydrocarbons concentration.

TABLE 13
COMPARISON OF TOXICITY VALUES USED IN HHRA TO CURRENT VALUES FOR COCs
AREA 41 - FUEL FARM AND PHOTO LAB AREA
FAA William J. Hughes Technical Center

Contaminant	Oral Carcinogenic Potency Factor $(mg/kg/day)^{-1}$		Reference Dose (mg/kg/day)	
	Value used in HHRA	Current Value	Value used in HHRA	Current Value (chronic)
Chlorobenzene	NA	NA	2.0E-02	2.00E-02
Ethylbenzene	NA	NA	1.0E-01	1.00E-01
Toluene	NA	NA	2.0E-01	2.00E-01
Benzo(a)anthracene	1.15E+01	7.30E-01	NA	NA
Benzo(b)fluoranthene	1.15E+01	7.30E-01	NA	NA
Benzo(a)pyrene	1.15E+01	7.30E+00	NA	NA
Chrysene	1.15E+01	7.30E-03	NA	NA
Fluoranthene	NA	NA	4.0E-02	4.00E-02
Phenanthrene	NA	NA	NA	NA
Pyrene	NA	NA	3.0E-02	3.00E-02
2,4-Dimethylphenol	NA	NA	7.0E-03	2.00E-02
Phenol	NA	NA	6.0E-01	3.00E-01
Di-n-butylphthalate	NA	NA	1.0E-01	1.00E-01
Bis(2-ethylhexyl)phthalate	1.40E-02	1.40E-02	2.0E-02	2.00E-02
Butylbenzylphthalate	NA	NA	2.0E-01	2.00e-01
4,4-DDD	2.40E-01	2.40E-01	5.0E-04	NA
4,4-DDT	3.40E-01	3.40E-01	5.0E-04	5.00E-04

TABLE 13
COMPARISON OF TOXICITY VALUES USED IN HHRA TO CURRENT VALUES FOR COCs
AREA 41 - FUEL FARM AND PHOTO LAB AREA
FAA William J. Hughes Technical Center

	Oral Carcinogenic Potency Factor $(mg/kg/day)^{-1}$		Reference Dose (mg/kg/day)	
Contaminant	**Value used in HHRA**	**Current Value**	**Value used in HHRA**	**Current Value (chronic)**
PCBs (Aroclor 1260)	4.34E+00	Soil: 2.00E+00 Water: 4.00E-01	3.00E-4	NA
PCBs (Aroclor 1248)	7.70E+00	Soil: 2.00E+00 Water: 4.00E-01	NA	NA
PCBs (Aroclor 1254)	7.70E+00	Soil: 2.00E+00 Water: 4.00E-01	NA	Soil: 2.00E-05 Water: 2.00E-05
Antimony	NA	NA	4.0E-04	4.00E-04
Arsenic	1.75E+00	1.50E+00	1.0E-03	3.00E-04
Beryllium	4.30E+00	NA	5.0E-03	2.00E-03
Cadmium	NA	NA	1.0E-03	Soil: 1.00E-03 Water: 5.00E-04
Chromium	NA	NA	5.0E-03	3.00E-03 (hex chrome)
Copper	NA	NA	4.0E-02	4.00E-02
Lead	NA	NA	NA	NA
Mercury	NA	NA	3.0E-04	3.00E-04
Nickel	NA	NA	2.0E-02	2.00E-02
Selenium	NA	NA	5.0E-03	5.00E-03
Silver	NA	NA	3.0E-03	5.00E-03
Zinc	NA	NA	2.0E-01	3.00E-01

TABLE 14
COMPARISON OF ROD GROUNDWATER ARARS TO CURRENT ARARS
AREA B - FIRE TRAINING AREA
FAA William J. Hughes Technical Center

Contaminant	Max. Conc. Detected in Groundwater[1] (ug/L)	ARARs Specified in ROD (ug/L)			Current ARARs (ug/L)		
		NJ MCL	Federal MCL	NJ Ground Water Quality Standard (PQL)[2]	NJ MCL[3]	Federal MCL	NJ Ground Water Quality Standard (PQL)[2]
Chlorobenzene	(in product only at 11,000,000)	4		2	50		2
1,1-Dichloroethene	16	2	7	2	2	7	2
Ethylbenzene	340		700	5		700	5
Methylene Chloride	2,500	2		2	3		2
Toluene	26		1,000	5		1,000	5
Xylene (total)	3,700	44	10,000	2	1,000	10,000	2
Tetrachloroethene	100	1	5	1	1	5	1
1,1,1-Trichloroethane	6	26	200	1	30	200	1
Trichloroethene	8	1	5	1	1	5	1
Chromium	41.4		100	21.54		100	10
Lead	28.1		15[5]	25[4]		15[5]	10
Mercury	51.6		2	0.6[4]		2	0.5
Zinc	92.8			64.5[4]			30

[1] Includes EI/FS monitoring results and quarterly monitoring results.
[2] GWQS are background groundwater quality or PQL, whichever are higher; PQLs are listed here.
[3] Federal MCLs incorporated by reference for all other compounds
[4] Background levels, as defined at the time the ROD was signed, were listed as GWQS in the ROD.
[5] Action level for lead.

TABLE 15
COMPARISON OF TOXICITY VALUES USED IN HHRA TO CURRENT VALUES FOR COCs
AREA B - FIRE TRAINING AREA
FAA William J. Hughes Technical Center

Contaminant	Oral Carcinogenic Potency Factor $(mg/kg/day)^{-1}$		Reference Dose (mg/kg/day)	
	Value used in HHRA	Current Value	Value used in HHRA	Current Value (chronic)
Acetone	NA	NA	1.0E+00	9.00E-01
Bromochloromethane	NA	NA	NA	NA
Chloroform	6.1E-03	NA	1.0E-02	1.00E-02
1,1-Dichloroethane	NA	NA	NA	1.00E-01
1,1-Dichloroethene	NA	NA	9.0E-03	5.00E-02
cis-1,2-Dichloroethene	NA	NA	1.0E-01	1.00E-02
1,2-Dichloropropane	NA	6.80E-02	NA	NA
Ethylbenzene	NA	NA	1.0E-01	1.00E-01
Methylene chloride	7.5E-03	7.50E-03	6.0E-02	6.00E-02
Tetrachloroethene	NA	5.20E-02	1.0E-01	1.00E-02
Toluene	NA	NA	2.0E+00	2.00E-01
1,1,1-Trichloroethane	NA	NA	NA	2.00E-01
Trichloroethene	1.1E-02	4.00E-01	NA	3.00E-04
Xylene (total)	NA	NA	2.0E+00	2.00E-01
Bis(2-ethylhexyl)phthalate	1.4E-02	1.40E-02	2.0E-02	2.00E-02
Butylbenzylphthalate	NA	NA	2.0E+00	2.00E-01
Di-n-butylphthalate	NA	NA	1.0E-01	1.00E-01
Di-n-octylphthalate	NA	NA	2.0E-02	4.00E-02

TABLE 15
COMPARISON OF TOXICITY VALUES USED IN HHRA TO CURRENT VALUES FOR COCs
AREA B - FIRE TRAINING AREA
FAA William J. Hughes Technical Center

Contaminant	Oral Carcinogenic Potency Factor $(mg/kg/day)^{-1}$		Reference Dose (mg/kg/day)	
	Value used in HHRA	Current Value	Value used in HHRA	Current Value (chronic)
2-Methylnaphthalene	NA	NA	4.0E-02	4.00E-03
4-Methylphenol	NA	NA	5.0E-02	NA
Naphthalene	NA	NA	4.00E-02	2.00E-02
Phenol	NA	NA	6.00E-01	3.00E-01
1,2,4-Trichlorobenzene	NA	NA	1.0E-02	1.00E-02
4,4-DDE	3.4E-01	3.40E-01	NA	NA
4,4-DDT	3.4E-01	3.40E-01	5.0E-04	5.00E-04
Heptachlor epoxide	9.1E+00	9.10E+00	1.3E-05	1.30E-05
PCBs (Aroclor 1242) (soil only)	7.7E+00	2.00E+00	NA	NA
Arsenic	3.0E-04	1.50E+00	1.8E+00	3.00E-04
Cadmium (soil only)	NA	NA	1.0E-03	1.00E-03
Chromium III	NA	NA	1.0E+00	1.50E+00
Chromium VI	NA	NA	5.0E-03	3.00E-03
Copper	NA	NA	3.7E-02	4.00E-02
Lead	NA	NA	NA	NA
Mercury	NA	NA	3.0E-04	3.00E-04
Zinc	NA	NA	3.0E-01	3.00E-01

TABLE 16
COMPARISON OF ROD GROUNDWATER ARARS TO CURRENT ARARS
AREA E - BUILDING 11 TANK EXCAVATION AREA
FAA William J. Hughes Technical Center

Contaminant	Max. Conc. Detected in Groundwater[1] (ug/L)	ARARs Specified in ROD (ug/L)	Current ARARs (ug/L)		
		NJ Ground Water Quality Standard[2]	NJ MCL[3]	Federal MCL	NJ Ground Water Quality Standard[2]
Tetrachloroethene	2	1	1	5	1
1,1,1-Trichloroethane	9	1	30	200	1
Bis(2-ethylhexyl)phthalate	310	1		6	1
Beta-BHC	0.29	0.04		--	0.04
Chlordane	8.9	0.5		2	0.5
Heptachlor epoxide	0.23	0.2		0.2	0.2
Antimony	61.6	20		6	20
Arsenic	120	8		10	8
Cadmium	7.5	2		5	2
Mercury	0.9	0.5		2	0.5
Nickel	46.3	10		--	10
Selenium	29.9	10		50	10
Zinc	143	30		--	30

[1] Includes EI/FS results
[2] GWQS are background groundwater quality or PQLs, whichever are higher; PQLs are listed here.
[3] Federal MCLs incorporated by reference for all other compounds

TABLE 17
COMPARISON OF TOXICITY VALUES USED IN HHRA TO CURRENT VALUES FOR COCs
AREA E - BUILDING 11 TANK EXCAVATION AREA
FAA William J. Hughes Technical Center

Contaminant	Oral Carcinogenic Potency Factor (mg/kg/day)-1		Reference Dose (mg/kg/day)	
	Value used in HHRA	Current Value	Value used in HHRA	Current Value (chronic)
Tetrachloroethene	5.2E-02	5.20E-02	1.0E-02	1.00E-02
Toluene	NA	NA	2.0E-01	2.00E-01
1,1,1-Trichloroethane	NA	NA	2.8E-01	2.00E-01
Xylene (total)	NA	NA	2.0E+00	2.00E-01
Bis(2-ethylhexyl)phthalate	1.4E-02	1.40E-02	2.0E-02	2.00E-02
Acenaphthene	NA	NA	6.0E-02	6.0E-02
Benzo(a)anthracene	7.3E-01	7.3E-01	NA	NA
Benzo(a)pyrene	7.3E+00	7.3E+00	NA	NA
Benzo(b)fluoranthene	7.3E-01	7.3E-01	NA	NA
Benzo(k)fluoranthene	7.3E-02	7.3E-02	NA	NA
Chrysene	7.3E-03	7.3E-03	NA	NA
Fluoranthene	NA	NA	4.0E-02	4.0E-02
Fluorene	NA	NA	4.0E-02	4.0E-02
2-Methylnaphthalene	NA	NA	2.0E-02	4.0E-03
Phenanthrene	NA	NA	2.0E-02	NA
Pyrene	NA	NA	3.0E-02	3.0E-02
beta-BHC	1.8E+00	1.8E+00	NA	NA
Chlordane (total)	3.5E-01	3.5E-01	5.0E-04	5.0E-04

TABLE 17
COMPARISON OF TOXICITY VALUES USED IN HHRA TO CURRENT VALUES FOR COCs
AREA E - BUILDING 11 TANK EXCAVATION AREA
FAA William J. Hughes Technical Center

Contaminant	Oral Carcinogenic Potency Factor (mg/kg/day)-1		Reference Dose (mg/kg/day)	
	Value used in HHRA	Current Value	Value used in HHRA	Current Value (chronic)
4,4-DDE	3.4E-01	3.40E-01	NA	NA
4,4-DDT	3.4E-01	3.40E-01	5.0E-04	5.00E-04
Dieldrin	1.6E+01	1.6E+01	5.0E-05	5.0E-05
Heptachlor expoxide	9.1E+00	9.10E+00	1.3E-05	1.30E-05
Antimony	NA	NA	4.0E-04	4.0E-04
Arsenic	1.5E+00	1.50E+00	3.0E-04	3.00E-04
Beryllium	NA	NA	2.0E-03	2.0E-03
Cadmium (soil only)	NA	NA	1.0E-03	1.00E-03
Chromium III	NA	NA	1.5E+00	1.50E+00
Chromium VI	NA	NA	3.0E-03	3.00E-03
Copper	NA	NA	3.7E-02	4.00E-02
Lead	NA	NA	NA	NA
Mercury	NA	NA	3.0E-04	3.00E-04
Nickel	NA	NA	2.0E-02	2.0E-02
Selenium	NA	NA	5.0E-03	5.0E-03
Thallium	NA	NA	7.0E-05	8.00E-05 (salts)
Zinc	NA	NA	3.0E-01	3.00E-01

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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SEP 24 2004

Mr. Keith Buch, Project Manager
FAA William J. Hughes Technical Center
Environmental Section, ACT-614
Building 270, Room A117
Atlantic City International Airport, NJ 08405

Re: CERCLA Five-Year Review
FAA Technical Center

Dear Mr. Buch,

I am writing in regard to the Federal Aviation Administration's (FAA) September 2004 Five-Year Review Report for the FAA Technical Center. My office has reviewed the subject report on behalf of the U.S. Environmental Protection Agency (EPA), and I am pleased to advise you that EPA concurs with protectiveness determinations made in the report. Our review was conducted in accordance with EPA's "Comprehensive Five-Year Guidance" (OSWER Directive No. 9355.7-03B-P). Pursuant to 40 CFR 300.430(f)(4)(ii) reviews, no less often than every five years, are required of any remedial actions, that have been selected in Records of Decisions, which do not allow for unlimited use and unrestricted exposure.

Beyond the remedial actions evaluated in this review, FAA is also proceeding with additional studies, designs and remedial actions (including institutional controls) that may be necessary to protect public health and the environment at other areas at the FAA Technical Center. Remedies at these remaining areas are at various stages in the Superfund process. Until such time as all remedy decisions have been made for the FAA Technical Center, a comprehensive sitewide protectiveness determination must be reserved.

Notwithstanding the above, EPA concurs that the remedies selected and implemented for the FAA Technical Center, as reported in this Five-Year Review, are protective. As EPA concurs with the protectiveness determination made by FAA, EPA accepts the September 2004 Report as submitted.

If you have any questions, please call me at 212-637-4391 or have your staff contact Bill Roach, EPA Project Manager, at 212-637-4335.

Sincerely,

George Pavlou, Director
Emergency and Remedial Response Division